ALAGAPPA UNIVERSITY

[Accredited with 'A+' Grade by NAAC (CGPA:3.64) in the Third Cycle
and Graded as Category–I University by MHRD-UGC]

(A State University Established by the Government of Tamil Nadu)

KARAIKUDI – 630 003

Directorate of Distance Education

M.A. [Child Care & Education]

IV - Semester

312 42

EDUCATIONAL AND INSTRUCTIONAL TECHNOLOGY FOR YOUNG CHILDREN

Dr.G.Sivakumar, M.Sc, M.Phil, M.Ed, M.Phil (Edn), Ph.D (Edn), NET (Edn), PGDHE, *Assistant Professor in Education, College of Education, Alagappa University, Karaikudi -03*

SYLLABI-BOOK MAPPING TABLE

Educational and Instructional Technology for Young Children

Syllabi	Mapping in Book
BLOCK I: EDUCATIONAL AND INSTRUCTIONAL TECHNOLOGY **Unit - 1:** Educational and Instructional Technology Educational and Instructional Technology - Meaning, Nature, scope, Definition, Objectives and Significance - Educational Technology and Instructional Technology - Role and Recent Trends. **Unit - 2:** Approaches of Educational Technology Approaches of Educational Technology - Hardware, Software, System approach, Individual & Mass media approach. **Unit - 3:** Differential Instruction Differential Instruction, Universal Design of learning and Individualized Instruction - Implication of the above for inclusion. **Unit - 4:** Information and Communication Technology ICT - Meaning, Definition, Scope and Significance - Psychological bases for ICT among teachers and learners.	**Unit 1:** Educational and Instructional Technology **(Pages 1-24);** **Unit 2:** Approaches of Educational Technology **(Pages 25-41);** **Unit 3:** Differential Instruction **(Pages 42-51);** **Unit 4:** Information and Communication Technology **(Pages 52-60)**
BLOCK II: DEVELOPMENT OF ICT **Unit - 5:** Development of ICT Development of ICT - Stages, Requirement and Process - Use of ICT in developing collaborative networks for sharing and learning such as Internet - E - mail, Tele- teaching, Tele conference to communicate with families and children in other places. **Unit - 6:** Technology Tools and Interactive Media Technology Tools and Interactive Media -Use of ICT to simplify record keeping, information management in education administration in special and inclusive settings. **Unit - 7:** Multimedia Multimedia - Meaning, Nature, Scope, Definition and Approaches - Types of Instructional Aids: Projected & non - projected Aids, Projectors, Radio, Tape Recorder, Television, Films, Computers, Whiteboard, Smart Board, e-Flash Cards, Educational Toys. **Unit - 8:** Recent Trends in Multimedia Advantages, Limitations and Challenges of Using Multimedia in Education - Recent Trends in Multimedia - Implication of Multimedia in teaching learning.	**Unit 5:** Development of ICT **(Pages 61-73);** **Unit 6:** Technology Tools and Interactive Media **(Pages 74-87);** **Unit 7:** Multimedia **(Pages 88-124);** **Unit 8:** Recent Trends in Multimedia **(Pages 125-137)**
BLOCK III: DISABILITY FRIENDLY TECHNOLOGY **Unit - 9:** Enhancing Technology Friendly Practices among Teachers Enhancing Technology Friendly Practices among Teachers - Computer - Assisted & Computer Managed Instructions, Cybernetics, E-Learning, Use of Net search and Websites **Unit - 10:** Disability Friendly Technology Disability Friendly Technology - Punarjani and e-learning Framework developed by C-DAC - Developing Technology Integrated Lessons - Sharing e-books with Individual and Group. **Unit - 11:** Implications of Technology based Instruction in Inclusion Implications of Technology based instruction in Inclusion - digital storytelling with children - Co-create digital books with photos of the children's play or work - digital audio files with the child as the narrator.	**Unit 9:** Enhancing Technology Friendly Practices **(Pages 138-161);** **Unit 10:** Disability Friendly Technology **(Pages 162-174);** **Unit 11:** Implications of Technology Based Instruction **(Pages 175-186)**
BLOCK IV: APPLICATION OF TECHNOLOGY **Unit - 12:** Application of Technology Application of Technology in Worksheet Preparation, Report Writing and Evaluation. **Unit - 13:** Application of Technology in Assistive Devices Application of Technology in Assistive Devices - For example, JAWS, Smart Phones, Screen Readers **Unit - 14:** Application of Technology in Instruction Application of Technology in Instruction - Individual, small group and large group - Advantages, merits and demerits - Implications for inclusion	**Unit 12:** Application of Technology **(Pages 187-199);** **Unit 13:** Application of Technology in Assistive Devices **(Pages 200-206);** **Unit 14:** Application of Technology

CONTENTS

UNIT-1 EDUCATIONAL TECHNOLOGY AND INSTRUCTIONAL TECHNOLOGY

Structure

1.1 INTRODUCTION

This unit discusses about the Education technology, in the capacity of technology of education, provides valuable help in the total teaching-learning process for achieving the best possible results in an economic way through the available human and non-human resources. In this respect, the major objectives of education technology and types of educational technology can be summarized as follows;

1.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the meaning of Educational Technology
- Define the term Educational Technology
- Understand the importance of Educational Technology
- List out the characteristics of Educational Technology
- Understand the significance of Educational Technology.

Objectives at the Macro level

In view of the broad educational goals, i.e. the macro level, the objectives of educational technology can be listed in the following way:

1. To identify educational needs and aspirations of the community.
2. To determine the aims of education, broad strategies and structure of education.

3. To develop a suitable curriculum with interaction of science, art and human values.
4. To identify man-material resources and strategies for achieving the stipulated aims of education.
5. To develop certain models leading to improvement of the process of teaching and learning.
6. To develop the appropriate aids and equipment to meet the educational purposes.
7. To identify major constraints in the environment and the ways and means to tackle those.
8. To help in extending educational opportunities to the masses especially the neglected section of the community.
9. To manage the whole educational system covering planning, implementation and evaluation phases.

Objectives at the Micro level

In view of the specific classroom teaching, i.e. the micro level, the objectives of educational technology are as follows:

1. To identify and analyze the characteristics and educational needs of the pupils.
2. To determine the specific classroom objectives and state them in behavioral terms.
3. To analyze the contents of instruction and organize it in a proper sequence.
4. To identify the available teaching-learning material and resources.
5. To identify the nature of the interaction of the sub-systems like students, teachers, teaching-learning material, content of instruction and methodologies.
6. To plan the teaching strategies and utilize the man-material resources for achieving specific classroom objectives.
7. To evaluate the effectiveness of the classroom teaching in terms of the pupil's performance or change in behavior.
8. To provide appropriate feedback to the students as well as teachers to bring modification in the teaching-learning process.

1.3 ORIGIN AND HISTORY

Educational technology, in terms of terminology and structural composition, may carry out two basic components, namely education and technology. Although both of them have been in a continuous process of evolution, we are focusing here more on the evolutionary nature of the second component, i.e. technology, simply on the ground that educational technology as a subject has its sole concern with the task of identifying the most suitable, appropriate and developed technology (both hardware and software) for serving the educational needs and purposes of the students and the society at a particular time and place.

It is a matter of no secret that there has been a continuous shift in the nature of the use of technological means and measures for improving the processes and products of education depending upon the type of excellence attained by the members of the society and communities all over the globe in terms of the scientific, philosophical, psychological and technological progress and advances. This is why; we can witness a continual shift in the modes and means of technology being used for serving the cause of education in different periods of human history and civilization. This process can be summarized as follows:

- In the early period of human history, when writing was unknown, the method of verbal presentation on the part of the teachers and citation and memorization on the part of the students was a common practice in almost all the civilizations of the world. Socrates' teacher-pupil oral dialogue system prevalent in the west and oral teaching tradition maintained by the ancient sages in the *Gurukuls* of our country may be cited as a testimony of the use of relevant technology in the field of teaching learning at a particular age in the progress of human civilization

- With the advent of writing as the means and materials of communication, like writing on the leaves and tree-trunks, engraving on the metals and rocks, and then the use of some type of paper and ink material provided the next breakthrough in the use of writing technology for teaching and learning. In the time to come, it provided a great impetus in the field of teaching and learning which witnessed the use of the subject matter available in the form of printing material and textbooks. A great scientific and technological advancement.

- The use of writing and printing technology then took its next leap in helping the cause of teaching and learning by being utilized in the production and use of the instructional material like chalk or blackboards, pictures, charts, models, maps, diagrams and other graphic material.

- Later on, with the industrial development and technical advancement, sophisticated scientific instruments, mass media and educational materials were used. It brought the use of sophisticated hardware and software such as radio, television, tape recorder, films, transparency, etc. in the field of education.

- The concept of programmed instruction and theories of learning, later, added another dimension to the meaning and concept of education technology. This was again broadened when the new approaches in the form of system-approach, microteaching, interaction analysis and computer assisted instruction came into existence.

In this way, with the introduction and subsequent use of new approaches, contents, theories, means and materials, managerial skills and objectives in the field of teaching and learning, there has been a gradual shift in the meaning, definition, concept, nature and scope of the term educational technology or teaching technology. It has resulted in defining educational technology in a variety of ways.

1.4 MEANING AND DEFINITION

G.O.M Leith: "Educational technology is the systematic application of scientific knowledge about teaching-learning and conditions of learning to improve the efficiency of teaching and training (Leith, 1967)".

Shiv K. Mitra: "Educational technology can be conceived as a science of techniques and methods by which educational goals could be realized (Mitra, 1968:4)".

S.S. Kulkarni: "Educational technology may be defined as the application of the laws as well as recent discoveries of science and technology to the process of education (Kulkarni, 1969)".

D.Unwin: "Educational technology is concerned with the application of modern skills and techniques to requirements of education and training. This includes the facilitation of learning by manipulation of media and methods, and the control of environment in so far as this reflects on learning (Unwin, 1969)".

W.Kenneth Richmond: "Educational technology is concerned with providing appropriately designed learning situations which holding in view the objectives of teaching or training, bring to bear the best means of instruction (Richmond, 1979)".

I.K. Davies: "Education technology is concerned with the problems of education and training context and it is characterized by the disciplined and systematic approach to the organization of resources for learning. (Davies, 1971)."

J.R.Gases: "Education technology has to be seen as part of a persistent and complex endeavor of brining pupils, teachers and technical means together in an effective way (Ford Foundation Team, 1971)."

US President Commission of Enquiry: "Education technology may be defined as a systematic way of designing , carrying out and evaluating a total process of teaching and learning in terms of specific objectives based on findings from research in human learning and communication (cited in, Tucker, 1979;159)."

DES Working Party UK: "Education technology is the development, application and evaluation of systems, techniques and aids in the field of human learning (cited in, Tucker 1979:159)."

Scottish Council for Educational Technology: "Education technology is systematic approach to designing and evaluating learning and teaching methods and methodologies and to the application and exploitation of media and the current knowledge of communication techniques in education, both formal and informal (cited in, Tucker 1979:160)."

An overview of the definitions listed here reveals that there exist wide differences of opinion regarding a particular definition of the term educational technology. These definitions initially encompass the whole range of education technology activities from the analytic methods of psychology of learning and teaching to the audio-visual communication and mass media technology. The views propagated by these definitions may help us to conclude about the meaning and nature of educational technology as follows:

1. Educational technology is concerned with the systematic application of science and technology in the field of education and thus may be defined as the application of technology to education in order to further the cause of the latter.
2. Just as science and technology help in carrying out the practical task in general, educational technology helps in providing efficiency to the task of teaching and learning.
3. Educational technology provides technical guidance and solution to the problems of education.
4. Teaching is communicating and education technology can play an effective role in the communication between teacher and student.
5. Education technology encompasses the total teaching and learning process involving the elements like the following:
    - Specification of goals and behavioral objectives.
    - Analysis of the characteristics of the learner.
    - Selection and organization of the content or subject matter to be learned.
    - Methods and strategies of the presentation of the content.
    - Use of aid-material, software and hardware, mass media and communication techniques.
    - Effective arrangement of learning situations and learning environment.
    - Effective classroom control and management.
    - Continuous feedback and evaluation of the results.
6. "Education technology is not limited to the use of audio-visual aids and does not symbolize merely educational hardware such as the sophisticated gadgets and mechanical devices used in education. For the effective management of the total teaching-learning process it tends to utilize the results of all good, experiments and researches in the field of human learning and

the non-human resources to achieve the desired educational objectives.

In this way, the term education technology carries a wide meaning. It can neither be confined to the use of audio-visual aids, software materials and hardware equipment, nor can it be limited to the use of psychological principles and instructional theories for bringing improvement in education. It should cover all that happens during the planning, implementation and evaluation of the teaching-learning process. It should devise ways and means to explore and utilize all the resources to bring improvement in the teaching-learning process.

In brief, *educational technology should stand for a wise application of the available human and non human resources for providing appropriate solution to the educational problems and to improve the processes and products of education*.

1.5 NATURE OF EDUCATIONAL TECHNOLOGY

To understand the nature of educational technology, let us try to view it from the following angles:

1. Evolution of the concept of educational technology.
2. Existing position and latest concept.
3. Distinction from other related concepts.

Evolution of the concept of Educational Technology

It may be discussed in detail as follows:

- The earliest concept of educational technology was linked with the use of audio-visual aids like charts, models, maps, specimen and concrete material. In this sense, the term educational technology was used as a synonym to audio-visual aids meant for direct teaching and learning.
- With the advent of physical science and consequently the electronic revolution there came an era of sophisticated hardware and software (gadgets and mechanical devices) like projectors, tape-recorders, radio and television. As a result, educational technology was taken in terms of these sophisticated instruments and equipments used for presenting instructional material.
- Then came the age of mass media. It led to a massive communication revolution for instructional purposes. Utilization of radio, television, tele-text and computer-assisted instructions for individualized learning, thus, brought more sophistication in the use of appliances and instruments for formal and informal education.
- With the advent of programmed learning and programmed instruction concept, a new dimension of educational technology came into the educational horizon. It tried to individualize the process of education and introduced a system of self-learning in the

form of designed self-instructional material and teaching machine. As a result, educational technology was regarded, as being concerned with the preparation and use of individualized instruction or self-instructional programmed material, leading to the use of teaching machine for auto-instruction or learning.

- The concept of programmed learning added another dimension to the meaning of educational technology when some new devices and approaches like wide applications of the theories of learning and teachings, micro-teaching, analysis of behaviors' and systems approach, etc. came into existence.

The Existing Position and latest concept

Although the term "Education technology" has been in vogue for several decades, yet on account of its complex nature involving many disciplines and demanding too much specialization and understanding of the planning, processing and products of education, it has been narrowly conceived by different individuals depending on where one works and stands within the educational spectrum. It has resulted in the formation of varying concepts of educational technology. For example, for those who are working in audio-visual aids, educational technology is confined to the use of audio-visual aids, while mass media experts emphasize the importance of sophisticated hardware, software and communication technology. For the experts of programmed learning and individualized instruction, it means the programming of the self-instructional material and use of teaching machines or computer-aided learning material. There are others who tend to look at educational technology only from the management point of view and consider it as an application of system approach to teaching-learning.

In this way, in actual sense, educational technology exists, to a very large extent, in a fragmented way not only in India but also globally. As a result, in any course or scheme of educational technology related to B.Ed., M.A. or M.Phil. (Education) of the universities in India and abroad, we find significant diversification in terms of objectives, topics and coverage of contents. However, serious attempts are now being made to arrive at some general consensus to end the confusion and debate regarding the concept and meaning of educational technology. This latest concept involves the concept of systems engineering or systems approach originated from computer science.

According to this concept, educational technology is more than the sum of its parts. It is a systematic way of designing, carrying out and evaluation of the total process of learning and teaching in terms of specific objectives based on research in human learning and communication leading to a combination of human and non-human resources reorganized into an efficient and economic system for the best possible results. In other words, it means a systems approach adopted in the field of education to organize educational systems, keeping in view the broad objectives and the available resources.

This aspect of educational technology carries a wide meaning and multifaceted concepts. It emphasizes the application of systems approach to the study of the multidimensional problems of education. Some of the problem areas are as follows:

- The educational planning and organization.
- The psychology of learning.
- The curriculum development and course design.
- The production of teaching-learning material.
- Audio-visual method of presentation and dissemination of information, storage and retrieval.
- The allocation and management of human and non-human resources.
- The cost-effectiveness of media in education.
- Innovations.
- Evaluation.

1.6 SCOPE OF EDUCATIONAL TECHNOLOGY

Educational Technology aims to improve the quality of human learning. Educational technology is a field involved in applying a complex integrated process to analyze and solve problems in human learning. The scope of educational technology unlimited as it tries to reach out to more and more people involved in the teaching-learning process.

The scope of educational technology is as follows:

- Spelling out Educational Goals and objectives
- Curriculum Development
- Developing Teaching – Learning Materials and Resources
- Developing Human Resources
- Developing Tactics and strategies
- Developing Multi-sensory Aids
- Feedback Mechanism and Modification
- Develops Passive Instruction Services
- Develops Interactive Instruction Services
- Develops Learning Environment
- Develops Information Resources
- Develops Communication Devices
- To Reduce the Burden of Teachers

Educational technology and other related concepts

The concept and meaning of education technology may be made a little more clear by distinguishing it from other related concepts.

Educational technology and instructional technology

These two terms should not be considered as synonymous. Educational technology is a more comprehensive and broad-based concept.

Instructional technology is a subsystem of the main system of educational technology. Education is a comprehensive process and imparting of instruction is one of the several means to achieve the goals of education. As a result, the technology of instruction may be regarded as a part and section of the whole phenomenon of technology of education.

In strict sense, instructional technology is concerned with determining and providing appropriate stimuli to the learner to produce certain type of responses for making learning more effective. In other words, instructional technology determines the media, methods and material that may be used in a given teaching-learning situation for attaining the stipulated instructional objectives. On the other hand, educational technology is concerned with the scientific use of the available human and non-human resources for solving various problems of education (including instruction) for optimizing the results of the whole teaching-learning process.

Educational technology and teaching technology

Like instructional technology, teaching technology is also one of the sub-types of the system of educational technology. It concerns with the systematization of the process of teaching and provides necessary theory and practice for the teachers to bring improvement in the task of teaching. The concept of instructional technology is much wider than the concept of teaching technology as it also includes the means and material concerning individualized instructions and self-learning including teaching machines and computer-assisted learning, independent of the teachers and their acts.

Teaching technology is merely a specialized branch of educational technology which is meant for the teachers and the teaching process. While education, as a whole, can never be limited merely to the teaching process or teacher's task, educational technology can never be confined to teaching technology only. It is much more than mere teaching or instructional technology.

Technology of education and technology in education

The term 'technology in education' refers to the use of technological advancement such as various equipment, material and machines for educational purposes. It involves the increasingly complex range of audio-visual equipment, hardware and sophisticated electronic devices like projectors, films, radio, television, tape recorder, teaching machines, tele-text and computer aided instructions for individualized and group learning.

The term technology in education is thus a service concept like technology in the service of farming or agriculture or science in the service of mankind. In this sense, educational technology can provide its services to the teachers on the following grounds:

1. For explaining the purpose and functions of different forms of appliances, equipment and audio-visual material and mass media.
2. For providing training in acquiring the material and handling the equipment to overcome their reluctance to use new media and material.
3. For showing the relevance of the use of the equipment and material in the context of individualized and group learning for achieving the goals of formal or non-formal education.

The term, 'technology of education' or 'education technology' cannot limit itself to the role of service as confined in the case of technology in education. The term, technology of education, does not represent something added or helped from outside as a sounded in the case of technology in education. It signifies a system or technological approach to the problems of education. Emphasizing on this point of view, T.K. Robinson (1976) writes:

The strongest protagonists for educational technology are not, however, satisfied with a role limited to technology in education and the provision of audio-visual aids. They see themselves as crucially involved in the design and evaluation of systems of learning involving an understanding of the psychology of learning and of communication and information theory to be used to establish a rational for good teaching practice which uses a variety of media and modes and which enables the teacher to deploy his skills more effectively and apply them more widely. This is technology of education.

In a view of the discussion carried out in the above pages, the following conclusions can be drawn about the concept of educational technology:

1. Educational technology cannot be taken as a synonym to audio-visual aids, and technology in education emphasizes the concept of services. i.e. the use of different equipment, gadgets and mass media.
2. Education technology must mean technology of education presenting itself as a system for bringing improvement in the total process of teaching-learning by carefully analyzing its problems and reorganizing all available resources in an economic way for obtaining the optimum results.
3. Educational technology cannot be viewed in terms of its parts or processes. Instructional technology, teaching technology, behavior technology, programmed learning, micro-teaching, system analysis, management of teaching-learning, teacher or pupil behavior, etc. are all its constituents and resources. Not a single one of these alone is enough to represent the concept of educational technology. All these branches, innovations, approaches and strategies should be integrated as a whole according to the needs and requirements of the system represented by educational technology at a particular time in a given situation for accomplishing its useful objectives.

1.7 FORMS OF EDUCATIONAL TECHNOLOGY

"Education technology, as has already been discussed, has a wide range of scope and applicability in the field of education. In a broader sense, it stands for the application of the principles and techniques of science and technology as well as psychology and pedagogy in the activities of teaching and learning. As a result, it has been capable of providing necessary ways and means, theoretical as well as practical, for improving the processes and products of teaching-learning related to both formal and informal education. With such a broad concept, educational technology has formed its roots and wings in certain distinct aspects and forms in various courses and programmes related to the study and application of educational technology. These forms of educational technology, in general, can be listed as follows:

1. Teaching technology
2. Instructional technology
3. Behavioural technology
4. Instructional design technology

Let us discuss these forms of educational technology in detail.

Teaching technology

As already emphasized in this chapter, teaching technology, as a sub-system of educational technology, is concerned with the task of systematization of the process of teaching. However, teaching cannot merely be treated as a sum total of certain teaching skills. Although it is true that being a skilled job it involves certain specific skills, yet a mere acquisition of these skills does not make an individual a teacher. A teacher has to play the role of a technician by learning the art and science of teaching. In this sense, teaching must be regarded as a technology that a teacher should try to know and practice well if he wishes to be successful in his teaching job. Like a proper technician, he must be able to do his job effectively.

A technical knowledge and skill of task requires that it should be completed with reasonable economy and greater efficiency. If a teacher can teach well with the least efforts resulting into maximum productivity, then he can be thought of utilizing teaching as a technology. The essence of the application of technology lies in getting more and better output with the least input in terms of time and labour. If a teacher knows the art and technique or if he is in a position to make use of the teaching technology in realizing the teaching objectives, he can get more success in his task with the least of efforts.

If a teacher is in a position to make use of technology in teaching, he must be well equipped with the technological skills like the following, besides having a good knowledge or mastery over the subject matter:

1. Communication skill,
2. Skill of interaction with his students,
3. Skill of making the students to learn and think independently, and
4. Skill of evaluating and reinforcing pupil's learning behavior, etc.

Fundamental principles and characteristics of teaching technology

Teaching technology, as suggested by E.G.Vedanayagam (1988), can be distinguished because of certain characteristics and fundamental principles as follows:

1. Teaching is a scientific process and its major components are content, communication, and feedback.
2. There is a close relationship between teaching and learning.
3. It is possible to modify, improve and develop the teaching-learning activities.
4. The terminal behavior of the learner, in terms of learning structures, can be established by appropriate teaching environment.
5. Teaching skills can be developed and strengthened by means of feedback devices with or without sophisticated techniques.
6. Pre-determined learning objectives can be achieved by designing suitable teaching activities.
7. Use of achievement motivation technique enhances the output of the teacher and the learner.

Contents of teaching technology

Teaching technology possess certain basic things in the shape of the philosophy and acts of teaching. A teacher has to imbibe the art and techniques of this technology. How should a teacher in practice proceed for the use of teaching technology in the process of teaching-learning? This aspect has been closely analyzed by scholars like Glazer, Bruner, Gagne and Davies. Davies (1971), in his work *Management of Learning*, has presented the contents of teaching technology in the shape of four steps, namely planning of teaching, organization of teaching, leading of teaching and controlling of teaching. These four steps systematically prescribe the contents of teaching technology to be learnt and practiced by a teacher for becoming a teacher technician.

1. **Planning of teaching:** Through its first step, teaching technology helps a teacher to plan the details of his teaching journey to be travelled along with his students. For this purpose , it tells that a teacher must first try to formulate teaching-learning objectives to be realized through the ongoing teaching-learning process and then very carefully plan for the realization of these set objectives by taking care of

(i) the entry behavior of the learners, (ii) selection of appropriate learning experiences, (iii) selection of proper teaching methods, strategies and aid material, and (iv) creating a conductive and helpful environment for proper teaching-learning.

2. **Organization of teaching:** In its second step, teaching technology supplies the necessary knowledge and skills to the concerned teacher for arranging, relating and organizing all the available teaching-learning resources, men and material, for the proper realization of the set teaching-learning objectives in the most effective, efficient and economic way possible. Specifically here, it may talk about the ways and means of seeking cooperation of the administration personnel, parents and community; developing teacher's own competencies for better communication including use of proper teaching methods, aids and strategies; and organization and utilization of the available physical facilities and resources for the better teaching-learning.
3. **Leading of teaching:** The contents of teaching technology in this step provide necessary knowledge and skills for a teacher to motivate, encourage, and guide and thus, lead his students on the path of learning for the realization of the set teaching-learning objectives.
4. **Controlling of teaching:** Through its last step of managing teaching, the contents of teaching technology may help a teacher to acquire necessary knowledge and skill for the proper measurement and assessment of the teaching-learning outcomes, i.e. the output of his teaching in view of the set teaching-learning objectives.

Instructional technology

As the name suggest, this kind of education technology is meant for helping the instructor and the learner in the desired instructional task for the realization of the stipulated instructional objectives in a particular teaching-learning situation. In simple words, it is a type of technology meant for bringing improvement in the instructional process. Here, the term instruction stands for a certain type of command meant for getting some specific information, knowledge and understanding about a thing, system or process.

The type of technology which may help the learner and the instructor (or the self-instructional packages) in this task may be termed as instructional technology. Instructional technology, in this way, first try to plan what type of instruction and instructional material are needed in a particular teaching-learning situation and then suggests ways and means for the utilization of this instructional material for the proper realization of the instructional objectives.

Instructional technology, in this sense, must be regarded as a subsystem of education technology that is purely concerned with the process of imparting instructions to the learner for realizing the stipulated instructional objectives which is mostly cognitive (development of knowledge and understanding) in nature. The co native as well as effective domains of the learner's behavior are thus almost neglected in the services provided by instructional technology.

With the provision of self-instructional material through programmed instructional packages, teaching machines and computer-assisted learning, this type of technology makes the learner quite independent in his learning task. He is no more in need of a tutor or teacher for carrying out the instructional work and realizing the teaching learning objectives. The learning task, with the help of essential services provided by the instructional technology, thus becomes quite simple, systematic and interesting according to the learner's needs, abilities and pace of learning.

Understood, in this way, *instructional technology may be defined as a subsystem of educational technology which helps the instructor or the learner himself as a part of his self learning or auto instruction by determining the media, methods and material for the realization of the stipulated instructional objectives in a given teaching-learning situation.*

Let us visualize how does instructional technology helps the instructor and learner in the task of instruction and learning in a particular teaching-learning situation.

Setting of instructional objectives

Instructional objectives make the very core and heart of any instructional process. Whatever piece of instruction is planned, it needs the planning and setting of instructional objectives in the very beginning. What type of behavioral changes are to be expected after going through that piece of instruction to the learner is thus to be decided and set before proceeding further in the task of imparting instruction. Instructional technology may help instructor and learner to take decision about the instructional and learning objectives in close cooperation of the following:

- The age and grade level of the learner.
- The physical, emotional, social and mental potential of the learner.
- The previous experiences of the learner related to the subject and topic.
- The men-material resources available for imparting instruction.

For setting instructional objectives for a particular piece of instruction to a particular group of learners in the available teaching-learning situation, help may be taken from the knowledge and skills imparted by instructional technology available through its content material such as:

- Taxonomy of instructional objectives in the cognitive domain and affective domain (provided by Bloom and his associates) and for the psychomotor domain (provided by Simpson as well as Harrow).
- Writing the instructional objectives in behavioural terms by taking the help of Robert Manger's approach, Robert Miller's approach or RCEM approach.

Taking decision about the instructional material

In view of the stipulated instructional objectives, what type of learning experiences should be provided to the learner needs to be decided at this stage? For this purpose, we have to select the teaching-learning experiences and then organize and integrate them properly for utilizing in the course of instruction. This instructional material is then divided in to properly related and sequenced units by following the principles of simple to complex, specific to general, theory to practice, etc. all such decisions about the selection and organization of the instructional material, for carrying out the task of instruction in view of the realization and stipulated instructional objectives, are always facilitated by the knowledge and skills provided by instructional technology.

In the case of auto-instruction, like programmed instruction, computer-assisted instruction, and teaching machines, the instructional material is well available in the form of well-arranged, sequenced form suiting the abilities, needs and requirement of the learners for learning at their own pace. The availability of such auto-instructional material has been possible only through the knowledge and skills provided by instructional technology.

Taking decision about the media and methods

Instructional technology may help the teacher and also the learners to select and make use of appropriate media and methods for carrying out the teaching-learning process. For this purpose, it brings into light the following facts:

There are varieties of media and methods available for imparting instruction. No single media or method is suitable for all types of instruction or a particular type of instruction in all teaching-learning situations. One has to take proper decision about the selection of a particular media and method or a combination of media and methods depending upon the nature of the piece of instruction and resources and environment available in a particular teaching-learning situation.

One should have a proper knowledge and skill for the use and application of a particular media and method for carrying out the work of instruction or auto-instruction. Instructional technology may help the teachers and students a lot in this direction by opening the gates of knowledge and skill that it can impart through its theoretical contents and

practical application. For this purpose, it contains the topics like the following in its prescribed syllabus or courses:

- Instructional strategies like lecture strategy, demonstration strategy, tutorial strategy, narration strategy, description strategy, explaining strategy, illustration strategy, role playing strategy, gaming strategy, group discussion strategy, question-answer strategy, discovery or heuristic strategy, problem solving strategy, excursion strategy, assignment strategy, brainstorming strategy, etc.
- Special instructional procedures for carrying out auto-instruction or self-learning like programmed instruction, instruction carried out with the help of teaching machines, computer-assisted instruction, personalized system of instruction (PSI), learner controlled instruction (LCI), etc.
- Cooperative or group instructional strategies like working on a project, living and learning in a community, team teaching, etc.
- Knowledge and application of various types of audio-visual aids and instructional material such as radio, television, tape recorder, projectors, charts, maps, diagrams and models.

Taking decision about the proper instructional environment

Instructional technology makes one aware or conscious of the need, selection and organization of a suitable instructional environment. It clearly emphasizes that a particular type of environment is essential for carrying out particular type of instruction, and it then helps the teacher as well as learner for the organization of that type of instructional environment.

Helping in the task of evaluation

Evaluation is the real key and controlling agency of any type of instructional activity carried out by the teacher or learner in the shape of auto-instruction. How far a teacher or learner has been successful in realizing the stipulated instructional objectives can be made known only through a well-planned strategy of evaluation.

Any course of syllabi of instructional technology contains the topics or contents which help the teachers to get acquainted with the strategies and material. Such topics or contents are: teacher-made tests, standardized tests, construction of the achievement tests, evaluating the cognitive, effective and psychomotor changes in pupils' behavior through suitable tests and techniques, self-evaluation tests, strategies and techniques.

In this way, instructional technology helps the teacher as well as the learners engage in the task of carrying out a particular piece of instruction from the very beginning till the end for the realization of the stipulated instructional objectives.

Behavioural Technology

Meaning

"Any manifestation of life is activity", says wood worth (1945), and behavior is a collective name of such activities. Therefore, the term human behavior includes all types of co native, cognitive and affective activities. However, when we talk about the study of behavior in psychology, we mean the study of behavior of all living organisms and not merely of human behavior. Therefore, behavioural technology, as one of the types/kinds of educational technology (owing its origin to the theory and practice of applied psychology) in its broad form, may be utilized to study and bring modification in the behavior of all living organisms.

The famous psychologist B.F. Skinner popularized the term behavioural technology while making use of his theory of operant conditioning for bringing the desired modifications in the behavior of living organisms. He demonstrated, through his experiments, how any type of learning or training can be induced in animals and human beings with the help of behavioural technology and how the task of shaping the behavior in a desired form and direction can be carried out with the help of means and material supplied by the behavioural technology.

Behavioural technology, in a broader technical sense, may also include behavior modification strategies which are not based on learning principles (e.g. chemotherapy, the use of physical restraints, and brain surgery). However, in school situations, the task of behavioural technology has almost become synonymous with the task of behavior analysis and behavior modification carried out through the principles of operant conditioning (shaping of the desired behavior) and observational learning (imitation of a model behavior).

A behavioural technologist tries to assess and modify the behavior in terms of both consequences (i.e. events that follow behavior) and antecedents (i.e. events that precede behavior). These antecedent events may be environmental events or cognitive events (i.e. thoughts, attitudes or perceptions) that are considered to influence behaviour.

Use and application of behavioural technology

The uses and applications of behavioural technology may be summarized as follows:

1. ***Analysis of behaviour:*** Behaviour technology may very well help in analyzing the observed behavior of the individuals in a proper way. An analyst with its help may state the behavior in specific, observable behavioural terms, e.g. he is daydreaming or wasting his time in gossiping or reacting in a specific way in a specific situation, etc. behaviourists have developed proper tools for the

analysis of such behavior. In the task of behavior modification of the teachers, Flanders has developed his interaction analysis system for analyzing the classroom behavior of the teachers in specific terms. With such an analysis of the observed behaviour, the existing behaviour patterns or behavioural problems of the concerned individuals may be very well ascertained.

2. ***Setting the target behavior for behaviour modification:***

Once the existing behaviour is known and analysed into specific behavior terms, the help of behaviour technology may be taken for setting as well as stating the target behaviour (Desired modified behaviour) in specific behavioural terms. For example , if a student behaves aggressively on the playground (showing undesired behaviours like pushing, grabbing, kicking and threatening to hurt other children), the desired modified target behaviour, according to a behavioural technologist, may be defined as “participating non-aggressively.

As a result of such naming, identifying and fixing of desired modified target behaviour in specific term, the actual task of behaviour modification then may become quite scientific, purposeful and goal-oriented.

3. ***Providing suitable ways and means for behaviour modification:***

In its third procedural step, behaviour technology supplies the necessary ways and means, tools, and techniques for the desired behavioural modification (attainment of the modified target behaviour) of the concerned individuals. Here it can help:

(a) The learners to acquire the desired learning experiences in terms of knowledge, understanding, skills, application, attitudes and values, by bringing changes in their entry behaviour.
(b) The teachers by suggesting ways and means for bringing changes in the learning and acquisition behaviour of their students.
(c) The parents, teachers, educational administrators, guidance personnel and social workers, by suggesting suitable technology for the prevention and treatment of behavioural problems and disorders.
(d) The parents and teachers to work with their children and students for the optimum growth and development of the desirable personality traits and behavioural acts.
(e) The teachers in learning proper teacher behaviour and acquiring needed teaching skills through special behavioural technology techniques like interaction analysis, micro-teaching, simulated teaching, team teaching, action research, etc.
(f) The teachers to manage properly the classroom behaviour and interaction of their students aimed at creating proper conducive environment for effective teaching-learning.

In this way, in a nutshell, behavioural technology may help the interested individuals to know the nature of the existing behaviour, the nature of the target (desirable modified) behaviour and the way and means to meeting the gaps between the existing and target behaviours.

For inducing the desired behaviour or for bringing the needed modification in the existing behaviour, behaviour technology, as said earlier, makes use of its own technology including appropriate learning principles based on operant conditioning and social learning. We will be discussing such special behaviour modification techniques later in this text in the name of Flander's interaction analysis, micro-teaching, role-playing, gaming and action research. However, here we are mentioning the two most important behavioural technology practices, namely shaping and modeling for bringing the desired modification in the behaviour of students.

In shaping technique (based on Skinner's operant conditioning), a slightly modified or improved behaviour is properly reinforced for attaining the desired degree of modification in one's behaviour. For example, if a student works out only two mathematical problems during a 20 minutes period and a teacher is set to improve students' problem-solving behaviour by increasing his frequency to solve 10 problems (having appropriate difficulty level) in that very duration, he has to make attempt in this direction by establishing a series of steps between the current level of performance and the target behaviour and also by providing appropriate reinforcement at each step.

As soon as the student progresses in some way, i.e. solving 3 or 4 problems in 20 minutes period or merely tries in this direction, he may be appropriately reinforced (rewarded for his improvement). The process of pushing him towards the target behaviour, thus, may go systematically by adopting an appropriate reinforcement schedule.

In adopting modeling as a technique of behaviour modification, the appropriate target behaviour is put before the child by a model for his observation. This model may be the teacher himself or may be the parents, the peers or somebody else in a video film or the television screen. The child tries to imitate and imbibe the observed behaviour of the model through the principle of social or observational learning.

Not only some specific behaviours but also quite complex sequences of behaviour like operation of any mechanical or electronic appliance or techniques of a game can be learned through such observation. The modeling strategy, thus, may work as a powerful self-instructional strategy for the acquisition of target behaviour.

Instructional Design Technology

Instruction as a process stands for helping the individuals as a learner for achieving the stipulated teaching-learning objectives. A good instruction is always goal-oriented with a specific purpose or purposes

implying that the manner in which a learner is imparted instructions (assisted in his learning process) should always be a well-conceived, planned and effectively controlled phenomenon. Educational technology, with one of its various domain/forms, namely instructional design technology, brings out effective instructional designs for improving the process and products of instruction.

These instructional designs, as Dr. Robert C.Branch, Syracuse University, USA emphasizes (1996:44), are meant for *"responding to the complexities associated with the instructional episode by analyzing, defining, testing and recommending strategies for implementing instruction."*

The term instruction design, in its simple meaning, thus stands for a layout or plan describing the manner in which an instructional process (involving teaching and learning and its interaction) should be carried out for attainment of the stipulated instructional objectives. An instructional design technology, in this way, should be essentially concerned with the planning, execution, and evaluation of the instructional process for the effective control on the process and products of instruction.

Emphasizing on such aspect, we can define instructional design technology as a form or type of technology concerning the *"application of modern skills and techniques to requirements of education and training (instruction). This includes the facilitation of learning by manipulation of media and methods, and the control of environment in so far as this reflects on learning"* (Unwin, 1969).

Instructional design technology, for exercising such control and manipulation, may be seen to adopt a few distinctive approaches like systems approach, cybernetic approach and training psychology for generating effective instructional design with a clear-cut motive of helping the learner and teacher in the attainment of the stipulated instructional objectives. We would be discussing in detail the theory and practice of these approaches at the later stage in the relevant chapters of this text.

1.8 MAJOR TRENDS IN EDUCATION TECHNOLOGY FOR THE MODERN SOCIETY

Education is an indispensable part of any modern society, and Education Technology can unfold a lot of 'not-realized' dreams of education institutes, education, and management. The education field is undergoing drastic changes because of different factors such as emerging technology innovation, student mobility, and government regulations. Suppliers to this industry are facing stiff pressure because of the high cost of books, low cost interactive web-based courses, and surge in the use of personal devices.

With easy internet access, the popularity of smart phone use, and social networking, the field of education has to grab opportunities for

content delivery of educational material in the form of eLearning. Organizations should realize the need for virtual colleges and classrooms. The never-stopping tech evolution necessitates easily accessible as well as reliable web-based education. Companies need to realize the potential with a new school of thought, best-in-class technology, and the right growth strategy.

Software development companies with years of experience could provide custom software development for the education industry. Such companies have years of experience working with educational institutes and publishers, and are well placed to help customers in the field to achieve their objectives and goals. Customers can achieve benefits such as:

- Online education
- Parents' collaboration
- Better student assessment
- Simplified and paperless administration with eLearning information systems.

6 Key Trends in the Education Technology

The following are some of the major trends in tech adoption in education:

1. Coding As a Literacy

The future of the digital economy can be driven by those with programming skills and an understanding of how computers work. It's becoming more relevant for students to interact with technology, and so they can control programs, devices, and apps they interact with.

2. Collaborative Learning

Collaborative learning models prove to be more and more successful. Collaboration mirrors how humans solve problems, and digital tools help students connect with each other. Synchronous and asynchronous workspaces are created in tools such as Google Apps for Education and Microsoft Classroom, and remove space, time, and demographic barriers among students.

3. Supporting Students as Creators

Learners are starting to explore subjects via active creation rather than passive consumption of content. Fabrication laboratories, maker spaces, intuitive creative suites of desktop programs, media centres, and applications provide hands-on opportunities for students to channel their creativity into solutions, inventions, and expressions.

4. Rethinking How Schools Work

Adaptive learning tools, as well as open educational courses, are personalizing as well as democratizing the way students learn. Combine these with a mobile tech such as a network-connected Smartphone or

tablet, and students will have a powerful anytime, anyplace, anywhere learning environment.

5. Redesigning Learning Spaces

Flexible learning spaces enable students to create as many groups as needed for lessons. Network-enabled classrooms enable students to connect and collaborate in familiar mobile and social modalities, which are part of their day-to-day digital habits outside of the classroom.

6. Deeper Learning Approaches

For students to stay motivated, they need to have a sense of how their skills and knowledge have an impact. Social media platforms such as Twitter, Snap chat, and We Chat keep students connected to local and global issues. When folded into pedagogy and combined with content creation tools such as We Video and YouTube, the same outlets can be used to contribute solutions or insights in meaningful ways.

The Importance of Technology In Today's Education

There are numerous reasons why technology is a major aspect of learning in schools. For students to survive in today's tough competition, they need to understand technology. These are the reasons why technology is very important in education:

- **Students demand it.**
  Students today are constantly engaging with technology outside the classroom. Kids like to be interactive, and technology-based learning has now become a part of their lifestyle.

- **New teachers demand it.**
  Technology has been implemented in post-secondary education and other professional areas. For new teachers, technology is considered a necessity for learning.

- **Kids can learn at their own pace.**
  Kids want to learn at their own pace, but at times traditional classrooms make it hard to do so. With technology integration in education, children can slow down and go back over concepts and lessons, and more advanced kids can go ahead. Also, technology allows teachers to help children on a more one-on-one level.

- **Kids are digital natives.**
  Children know technology better than most adults. It's become the easiest way they learn since it is an integral part of their life. Technology engagement in the classroom helps children not only learn better but also acquire multi-tasking skills.

- **There are no limitations with technology.**
  Having access to other information outside of school material provides students with various ways of learning a concept. Teachers can come up with creative ways of teaching their students, which keep them engaged. Technology has changed the learning space, so learning is now more hands-on.

Technology can definitely help teachers do a better job, not replace them. Thus, teachers don't have to worry about the way technology is revolutionizing the field of education. As schools and teachers continue adopting a growing number of tech solutions and software development tools, it's important to consider new trends in education and how students learn. Like other sectors in today's society, the field of education should be updated with the latest technologies to meet student's needs.

Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. Define Educational Technology.

………………………………………………………………………
………………………………..…………………………………………

2. Enlist the Objectives of Educational Technology?

………………………………………………………………………
…………………………………………………………..……………

1.9 LET US SUM UP

In this unit you have learnt the concept of Educational Technology like meaning of Educational Technology, definition of Educational Technology, importance of Educational Technology, characteristics of Educational Technology.

1.10 UNIT- END- EXERCISES

1. What is meant by Educational Technology?
2. Discuss the modern trends in Educational Technology.

1.11 ANSWER TO CHECK YOUR PROGRESS

1. Educational technology is the systematic application of scientific knowledge about teaching-learning and conditions of learning to improve the efficiency of teaching and training.
2. Modern trends in Educational Technology:
   The following are some of the major trends in tech adoption in education:

1. Coding As a Literacy
2. Rethinking How Schools Work
3. Redesigning Learning Spaces
4. Deeper Learning Approaches

1.12 SUGGESTED READINGS

1. Akyol, Z., & Garrison, D. R. (2008). The development of a community of inquiry over time in an online course: Understanding the progression and integration of social, cognitive and teaching presence. *Journal of Asynchronous Learning Networks*
2. Gunawardena, C. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferencing. *International Journal of Educational Telecommunications*
3. Jonassen, D.H. (1994, April). Thinking technology: Towards a constructivist design model. *Educational Technology.*
4. Saettler, P. (2004). *The evolution of American educational technology*. Greenwich, CT: Information Age Publishing.

UNIT-2 APPROACHES OF EDUCATIONAL TECHNOLOGY

Structure

2.1 INTRODUCTION

This unit discuss carried out in analyzing the concept of educational technology helped us to conclude that educational technology is a multifaceted concept. System approach and significance of educational technology and individual and mass media approach. Hence, in this unit you are going to learn the different types of educational technologies that will help you in the learning process.

2.2 OBJECTIVES

After going through this unit, you will be able to

- Understand the approaches of educational technology.
- Describe the different types of approach.
- Discuss the role of hardware and software technologies in modern educational practices.

APPROACHES OF EDUCATIONAL TECHNOLOGY

This has led to view it in terms of some specific types of approaches. Accordingly, Lumbsdaine (1964) has listed three distinct approaches of educational technology.

1. Educational technology I or hardware approaches.
2. Educational technology II or software approaches.
3. Educational technology III or systems approaches.

Let us discuss these types or approaches.

2.3 EDUCATIONAL TECHNOLOGY I OR HARDWARE APPROACH

This type of educational technology has its origin in physical sciences and engineering and is based on the concept of service, i.e. using technology in education (Silverman 1968). While teaching in a big hall, a teacher uses microphone for making his voice audible, he may be said to approach such type of educational technology for making his teaching effective. In this sense, audio-visual aids such as charts, models, slides, filmstrips, audio cassettes and sophisticated equipment and gadgets such as radio, television, films, projectors, tape recorder, record player, video, teaching machines and computers may mean to use the technological advancement in the world of communication for educational purposes. Such type of mechanical and technical revolution has almost mechanized the teaching-learning process.

The mass media movement, a result of this approach, is now contributing a lot to reach the educational benefit to masses with great ease and in a cost-effective way. In this way, hardware approach to education has resulted in improving the efficiency of educational means and reducing the cost of education. However, this type of technology or approach tries to enter education from outside, operating more in isolation than in combination. Almost all the material and equipment of hardware approach originally belong to areas other than education and are being borrowed and utilized for educational purposes.

2.4 EDUCATIONAL TECHNOLOGY II OR SOFTWARE APPROACH

While the first type of educational technology (hardware approach) has originated from the physical science and applied engineering, the second type of educational technology (software approach) owes its origin to the behavioural sciences and their applied aspects concerning the psychology of learning. Psychology of learning provided solid technology for bringing the desirable behavioural changes in the students and thus serves the cause of education by laying down definite instructional procedure, teaching behaviour and behaviour modification devices. It is in this sense that the second type of educational technology is sometimes referred to as instructional technology, teaching technology or behaviour technology.

Having originated from the theories of learning, this type of technology tries to adopt a process-oriented technique for the production of suitable teaching-learning material, teaching-learning strategies, and evaluation techniques for the optimum results in the process of teaching and learning. Thus, in this type and approach, educational technology basically stands for the technique of developing and utilizing software and, that is why, it is referred to as the software approach. In this sense, the materials, such as the programmed material and teaching-learning strategies based on psychology of learning are usually known as software

and the equipment and gadgets are called hardware. In hardware approach, we are more concerned with the production and utilization of audio-visual aid material, sophisticated instruments, gadgets, and mass media for helping the teacher and learners to achieve better results. On the other hand, in software we try to exploit the psychology of learning for the production and utilization of software techniques and material in terms of learning material, teaching-learning strategies, tools of evaluation, and other devices to soften and smoothen the task of teaching and learning.

2.5 Distinction between hardware and software technologies

Distinction between the hardware and software technologies may be made clear through the classification carried out in Table 1.1.

TABLE 1.1 Hardware and Software Technologies

Hardware Technology	Software technologies
1. Hardware technology has its origin in physical sciences and applied engineering.	Software technology has its origin in behavioural sciences and their applied aspects concerning psychology of learning.
2. It is more concerned with the production and utilization of audio-visual aid material and sophisticated instruments, and mass media for helping the teacher and learners in their task.	It makes use of psychology of learning for the production and utilization of software techniques and materials in terms in terms of learning material, teaching-learning strategies, and other devices for smoothening the task of teaching learning.
3. It tries to adopt product-oriented approach. What is produced through software technology in the shape of teaching-learning material and strategy gets utilized by the hardware instruments and gadgets for effective teaching-learning.	It tries to adopt a process-oriented technique or approach for the production of teaching-learning material. What is produced here is made available for being used by the hardware appliances.
4. It is based on the concept of service. It provides services in the field of education much in the same way as provided by telephone, electric heater and bulb in our day-to-day life. In this sense, hardware technology clearly stands for making use of technology in education.	Software technology does not provide direct services to its users as provided by hardware technology and applied engineering. It helps in the production of software material which is used by the hardware appliances and gadgets for delivering their services to the users, i.e. the teachers and learners.

5. As examples of the appliances and gadgets used in hardware technology service, we can name radio, television, tape recorder, video, slides and film projectors, teaching machines and computer.	As examples of the material produced through software technology, we can name programmed learning material, teaching-learning strategy on psychology of learning (put into practice in the shape of charts, pictures, models, slides, films, trips, audio and video cassettes, and software packages, etc.).
6. Hardware technology needs the services of software technology for its use and functioning. It cannot go without the aid of software technology, e.g. computer hardware in the shape of a machine like device is of no use if it does not make use of software service both for its operation as a machine and for its multidimensional utilities. The use of application and utility software is a must for taking any service from the hardware technology of the computers.	Software technology proves most useful and productive in the case if it is assisted and made into use by the hardware appliances and gadgets. However, it can itself deliver services to the users without any aid from the hardware technology, i.e. one can use programmed learning material, a graph, or a text directly for the individualized as well as group instructions.
7. Hardware technology has its mass appeal and utilization. It can contribute a lot in handing over the educational benefits to the mass with greater ease and economy.	Software technology has no such wide application and appeal to the masses as found in the case of hardware appliances like radio, telephone, computer applications, etc.
8. Hardware technology has resulted in improving the efficiency of educational means and reducing the cost of education. A teacher may handle a big class with the help of hardware appliances such as microphone, slides and film projectors.	Software technology contributes to increase the efficiency of the teachers a well as the learners. However, it lags being in the task improving efficiency and reducing cost of education.

2.6 ROLE OF HARDWARE AND SOFTWARE TECHNOLOGIES IN MODERN EDUCATIONAL PRACTICES

Technologies, by their nature and characteristics, stand for smoothening the execution process of a task leading to achieve the best possible results or outcomes from the execution of that task. The same is true for hardware and software technologies employed in the field of education. Here, they stand for bringing improvement in the process and products of teaching-learning from all the possible angles. However, we will try to limit ourselves in discussing their roles in some of the important modern educational practices.

1. **Individualization of instruction:** individualization of instruction is a major trend in the modern educational practices and is the demand of the hour. The psychology of individual differences has brought the necessity of organizing instructional process according to the needs, interests, pace and abilities of the individual learners. Use of hardware and software technology may help in this task on account of their very nature and possibility of application. In brief, we can highlight the role of hardware and software technologies on this account by stating some of the materials and equipment as follows:
    - Programmed instructions, programmed textbooks, and programmed learning modules.
    - Teaching machines, computer assisted instruction and computer managed learning.
    - Video and audio recorded learning and instructional material.
    - Email, internet, teleconferencing and other online educational facilities.
    - Special aid material, equipment and appliances used for special educational and adjustment measures for the disabled (physical, mental and learning disabled).
    - Special provisions and facilities for the creative and gifted to nurture and develop their individual capacities according to their pace and interests.

2. **Use of multimedia and multi-sensory approach to teaching-learning**: Hardware and software technologies help the teacher as well as learners for making a proper and judicious use of the multimedia and multi-sensory aid material, equipment and principles of teaching-learning, derived from psychology and technology of teaching. It has made the use of the following possible:
    - All the sensory organs sense of sight, hearing, touch, smell and taste for the acquisition of the desired teaching-learning experiences.

- Multimedia material and appliances involving hardware and software technologies for sharing desirable teaching-learning technologies.
- All the relevant and need teaching-learning methods, devices, and strategies well-accompanied and aided by hardware and software technologies.

3. Management of the affairs of educational practices in an efficient and productive way:

Use of software and hardware technology may help the teacher in the task of managing his affairs related to the educational and professional responsibilities in the spheres as follows:

- Planning of teaching-learning.
- Organization of teaching-learning.
- Leading teaching-learning.
- Controlling teaching-learning.

4. Providing proper input and process for the best possible outcomes(products):

In the true spirit of the system engineering, use of hardware and software technologies can help the educational and instruction systems to make all possible efforts for providing adequate input and the needed process organizations to arrive at the best possible outcomes, i.e. realization of stipulated teaching, learning objectives in a most efficient and cost-effective way.

5. **Fulfilling the expectation of distance and correspondence education:** The demands of today's education and modern educational practices are putting increasing emphasis on the increasing number of learners. In fact, distance, correspondence and online education is the need of hour and this need can only be better realized through the services of hardware and software technologies.

6. Making the task of teaching-learning interesting, purposeful and productive:

Use of hardware and software technologies help both teachers and learners in the realization of their teaching-learning objectives by making the task of teaching-learning quite interesting, purposeful and productive through the provisions as follows:

- Suggesting suitable teaching-learning methods, devices and strategies based on the psychology of teaching-learning.
- Suggesting suitable maxims and principles of teaching-learning based on theory and practice of the technology of teaching-learning.
- Putting various types of audio-visual aid material and equipment at the disposal of teachers and learners.
- Providing a variety of instructional and self-learning material suiting the varying needs of teaching-learning situations and individuality of the teachers and learners.

As a result of the help derived from the above-mentioned provisions, one can enjoy the serious task of teaching or learning leading him or her for the proper realization of his or her goals. A teacher by using transparencies through overhead projectors, interacting with students in their language laboratory, and making them discover the facts by observing a video film and audio recording, or taking online tutorial help through email or online-conferences, may always help his students relish the desired fruits of their efforts.

2.7 EDUCATIONAL TECHNOLOGY III OR SYSTEMS APPROACH

This type of educational technology is related to the concept of systems engineering which owes its origin to computer science. It represents the latest concept in technology of education. In this type and approach, educational technology stands for a systematic way to design, carryout and evaluates the total process of education in terms of specific objectives. Thus, it means a systems approach to organize educational system effectively and economically, keeping in view the educational objectives and available man-material resources.

The systems approach takes education as a system having a set of inputs which are subjected to a process, designed to produce certain outputs which are intended to meet the stipulated objectives of the system. The application of this type of educational technology takes the system of education as a whole and views it in the context of the specified objectives and functioning of its interrelated parts and the whole system under the existing constraints. If the system meets the requirements of the system objectives, it is maintained. If it does not fulfill the specified objectives, it is modified. As a result, various alternative strategies and tactics are explored, designed and implemented and the most appropriate and feasible one is retained.

Thus, in systems approach, one has to make a continuous comparison of the different roles played by man, machine and the media in a system of education and develop an appropriate instructional design and strategy in relation to the stipulated objectives. This type of educational technology or systems approach is a new concept in the field of educational technology. In India, at present, it is at the introductory stage but due to its usefulness and scientific as well as mathematical nature, it is likely to be developed as an effective means for the organization, management and development of education. This, in turn, can develop education as a sound system for serving the cause of individual and the society.

2.8 Scope and significance of Educational Technology

In describing the scope of educational technology, one has to seek answers for the following two questions:

1. What are the limits of its field of operation?
2. What is to be included in its study?

Both these questions are very much related to the meaning, concept and nature of the subject educational technology. Discussions about these aspects in the preceding pages has revealed that educational technology possesses a wider meaning and broader concept, which emphasizes the utilization of all the available resources in terms of knowledge of the teaching-learning principles, theories, human or non-human material resources, teaching-learning strategies and mass media, for the attainment of the stipulated objectives at both the macro and micro levels.

Keeping an eye over such broad concepts of educational technology, one is able to map out the areas of its operation in terms of topics or aspects covered through its study or application. In brief, they may be summarized as below.

1. *Analysis of the process of teaching and learning:* Educational technology tries to discuss the concept of teaching, analysis of the teaching process, variables of the teaching, phases of teaching, levels of teaching, theories of teaching, principles and maxims of teaching, the concept of learning, the relevance of the theories of learning, the relationship between teaching and learning, the integration of the theories and principles of teaching as well as learning for attaining optimum educational purposes.

2. *Spelling out the educational goals or objectives:* Education technology tries to discuss the topics such as identification of educational needs and aspirations of the community, survey of the resources available for the satisfaction of these needs and aspirants, spelling out the broad educational objectives, analysis of the broad objectives in terms of the specific classroom objectives of teaching and learning, specifications of these objectives in behavioural terms, etc.

3. *Development of the curriculum:* This aspect of educational technology is concerned with the designing of a suitable curriculum for the achievement of the stipulated objectives. It may describe the ways and means for the selection of suitable learning experiences or contents, organization of these contents in a suitable framework in order to bring out more effective instruction and thus analyze the suitability of the curriculum in relation to the objectives, means and material, and devices of evaluation.

4. *Development of teaching-learning material:* This area of educational technology is concerned with the production and development of the suitable teaching-learning material in view of the stipulated objectives, designed curriculum and available

resources. Here educational technology tries to discuss the essential techniques of developing software and instructional material like programmed learning material, computer assisted learning material, mass media instruction material, personalized system of instruction, planning for the teaching and learning and preparation of lesson plans, etc.

5. *Teacher preparation or teacher-training:* Teacher is a key figure in any process of teaching and learning. Educational technology, therefore, takes care of the proper preparation of teacher for exercising their complex responsibilities. For this purpose, educational technology includes topics like models of student teaching, micro-teaching, stimulated teaching, team-teaching, teacher effectiveness, modification of teacher-behaviour, classroom interaction, T-group training and interaction analysis etc.

6. *Development and selection of the teaching-learning strategies and tactics:* This aspect deals with the central problem of teaching-learning act. Here educational technology tries to describe the ways and means of discovering, selecting and developing suitable strategies and tactics of teaching in terms of the optimum learning and available teaching-learning resources, the availability of the different types of teaching methods, devices and models of teaching along with their appropriate selection and use for the optimum results.

7. *Development, selection and use of the appropriate audio-visual aids:* Teaching-learning is greatly influenced and benefitted by the use of appropriate audio-visual aids. Educational technology covers this aspect by discussing various types of audio-visual aids used for the educational purpose, their proper selection suiting to a particular teaching-learning situation, their development and production in view of the available resources and problems faced in a teaching-learning act, audio-visual methods of presentation and dissemination of information, their proper storage and retrieval, and consideration about their cost-effectiveness and effective utilization.

8. *Effective utilization of the hardware and mass media:* Various sophisticated instruments, equipment, gadgets and communication devices brought through mechanization and electronics revolution are playing an effective role in the attainment of educational objectives by helping the teachers and learners in their respective roles. Educational technology tries to describe these resources in terms of their specific functions and applicability in a particular teaching-learning situation; their selection, proper handling and maintenance; their preparation and development; the cost-effectiveness of these equipment and

mass media in education; appropriate teaching-learning material for these appliances; and the way and means of their optimum use in formal education on the individual and collective basis.

9. *To work for the effective utilization of the subsystem of education:* Educational technology considers education as a system operating, in a systemic and scientific way. For the achievement of educational objectives. For the coverage of a systematic approach, it tries to include the topics dealing with the theory and principles of a system approach, explaining education as a system. It also includes study of its different subsystems their operations and processes in terms of input and output, the needed development in the working of the subsystems in view of the economy, output and functionality of the system, and the organization and management of the system in an effective way by specifying the respective roles of the man, machine and media in relation to the purposes of teaching and learning.

10. *To provide essential feedback and control through evaluation:* Education technology is essentially concerned with the task of exercising appropriate control over the process of teaching and learning by planning and devising suitable tools and devices for the continuous evaluation of the process and products of the teaching-learning activities. Such evaluation provides an appropriate feedback to the learners as well as the teachers for bringing necessary improvement at the preparatory and implementation stages of their specific acts. For this purpose, educational technology discusses the ways and means of suitable evaluation techniques and their planning, development, selection and appropriate use in relation to the objectives of teaching-learning system.

Thus, educational technology is concerned with all the variables, phases, levels, and aspects of the teaching-learning process. In brief, it works for the overall planning and organization of the system or subsystems of education. It helps all those who are connected directly or indirectly to the processes and products of education. It teaches the teachers the art of teaching, the learners the science of learning, the educational planners the structure of planning, and the administrators or managers the skill of managing or administering the task of teaching and learning. It works for the individualization of instructions, as well as for improving the group-dynamics of the classroom. It reaches to the individuals, groups and the masses, privileged or unprivileged through its media and means. The use of mass media for educational purposes through radio, television, tee-text, and computer controlled devices and correspondence courses have given new dimensions to the application and scope of educational technology.

In the above discussion, an attempt has been made to identify the scope of the subject education technology by mapping out its field of operation, but in true sense, it is unwise to put hedge and boundaries around such a developing and fast growing subject. Its scope is essentially unlimited as it is concerned with the task of helping and organizing a discipline like education and the acts like teaching and learning that know no limits and boundaries. Educational technology is responsible for helping in each and every problem connected with education and there is never an end to the problems of education. Also there is no limit to the improvement in the art and science of teaching and learning. Therefore, the scope of educational technology should not be confined to the limited boundaries under any circumstances. Instead, it should be left free for necessary expansion and development so that it can carry out its mission, tasks and objectives.

Use and significance of Educational Technology (in the Indian Context)

In India, before the 1960s, the term educational technology was almost unknown to the education system. If at all this was used, it was used as a synonym to audio-visual teaching aids. In the early sixties, use of the term educational technology took its roots through programmed learning. The programmed learning-movement contributed a lot to the improvement of instruction in a number of ways. Gradually, the meaning and concept of educational technology has grown wider. At present, educational scenario in India witnesses the latest emerging trends in the field of educational technology. The role of an educational technologist in India, today, is not merely that of an audio-visual aid master, hardware expert, media expert or programmed text writer, but of one who is concerned with the information of an overall design to carry out an evaluation of the total process of education in terms of specific objectives. In other words, technology of today is accepting systems approach to the problems of education. The emphasis now is on the application of system analysis to organize and manage the task of teaching and learning, and frame out the alternative strategies and system for the improvement of education.

Educational technology, as we find, has a meaningful present and promising future in our country. It has been contributing a lot to the improvement of products and processes of education at all levels and stages of planning, implementation, and evaluation. It is serving the cause of formal as well as informal education and helping the developmental task of the country. Some of the significant developments in this direction may be summarized as follows:

1. There has been a wider and more effective utilization of radio for broadcasting educational programmes throughout the country. The programmes related to local needs and adult education have been very fruitful. These well-planned programmes are now broadcast throughout the country for both in-school and out-of-school groups.

Many states have taken steps to integrate the radio broadcasts with teaching in schools.

2. Another significant development in the use of educational technology is concerned with the development of television programmes. Today, telecast lessons and educational programmes have established themselves as an important educational medium in India. Formal as well as non-formal education of the country is now closely linked with the television instructions of the country. With the advent of satellite services, especially with the launching of the EDUSAT project, there has been a beginning of a series of innovative and constructive television programmes for national development and for educating the Indian masses living in remote,rural, or underdeveloped areas.

3. The third important area where educational technology has been useful is the problem of training and re-training a large number of school teachers in an effective way. This has been made possible through the use of mass media for in-service teacher education. The in-service teacher training courses by using a multimedia package, developed by the Centre of Educational Technology of NCERT, represent a major breakthrough in this direction. In the teacher education programme, the educational technology has helped to reorganize the courses and make them effective by introducing new practices and innovations in all aspects of the teacher preparation. It has added new dimensions by introducing micro-teaching, simulated teaching, team teaching, teaching models and similar other concepts.

4. Another application of educational technology in our country is known as distance education. It involves the use of combination of media for the instructional purposes and provides the facilities for out-of-school education in a very flexible way at any place and at any time in the life of a person.

5. Another major area where educational technology is being used in our country relates to language instruction. Besides producing material for language instructions through mass media, it has contributed towards the development and functioning of the language laboratories to teach Indian as well as foreign languages like German, French, Russian, English, etc.

6. Another field of operation of educational technology in our country is concerned with the correspondence education. Today, the well-planned and systematically developed correspondence courses are being provided by a number of universities in our country. There is also provision to offer these courses at intermediate and higher secondary levels. In these courses, students may be approached through four media, i.e. instructional material, students response sheets, personal contact programmmes and radio or telecast

instructions. The establishment of open school has been another major step in this direction. The teaching is provided here through specially prepared lessons, study centers, local counselors and tutors and summer as well as vacation courses.

7. Another use for which educational technology is being put in our country is concerned with the preparation, development and utilization of audio-visual material, and handling as well as maintenance of the hardware appliances and sophisticated gadgets. Departments of teaching aid, NCERR, has been doing significant service in this direction through training programmes of personnel, production of materials, conducting survey research and evaluation of the use of aid material, and providing guidance and service to the educational institutions regarding the use of aids and appliances.

8. In the latest trend, educational technology is proving its worth by utilizing the services of computers and advanced form of ICT technology in the field of education. Use of these advanced technologies has a tremendous scope in improving the products and processes of education. In the developed forms of computer and ICT technology, it can help the teachers, learners, researchers, administrators and educational planners to get access to a valuable treasure of knowledge, skill and application for improving their own tasks. Distance learning or education, virtual classrooms, e-learning and m-learning, are the latest concepts and trends that are emerging in the educational horizon of our country.

Thus, educational technology has been proving its worth in our country by guiding, planning, implementing and evaluating various programmes of formal as well as non-formal education. It is being used as a big helping hand for attaining the macro and micro objectives of education in our country.

2.9 The 'Individual and Mass Media Approach

The Individual Approach

In this phase learning material were created by taking into account behavioral psychology developed by B.F. skinner during 1950. As per his principals the learner is considered as active element in whole teaching and learning process. As the entire program is addressed to one single individual, his psychology, way of reactivity, his basic needs of learning such as monitoring work, giving feedback at every stage of learning process, right encouragement at the right movement is taken into account while designing the content. Content is divided into small segments leading to the ultimate goal. In the complete process a system was developed which gives continuous feed back to students about his performance. When a user uses this program as he is getting constant feedback from the program, he gets information about his progress in learning, so one can say

that minimum level of input of the content is assured provided the user complete his journey of learning. The construction of modern individualized learning material is now quite flexible and may involve use of printed material, audio CD's, slides, film stripes, models, computer programs etc. either on their own or in various combinations.

This system of learning is based on the principles of behavioral psychology theory. This theory is based on what is commonly referred to as stimulus and response, that is, it assumes that learning has occurred when a specific response is elicited from a learner when he is placed in a particular situation and given a particular stimulus. Learning of relatively complex behavior can be achieved through appropriate series of stimulus-response situations. At each stage the learner must actively participate by performing a set task, after which he is then supplied with immediate feedback in the form of correct answer.

This is known as successive reinforcement. Skinner also argued that each successive response step should be small enough to ensure that the learner is almost always correct in his response. Use of these small steps, plus successive reinforcement led to what behavioral psychologist believed was an efficient way of 'shaping behavior', as each and every stage of learning is meticulously planned the success of learner is well planned. He is sure to get the decided input of content step by step.

We can find application of principles of behavioral psychology in development of computer games, where there are challenges, constant feedback and immediate response to the user. As it works fantastically it attracts more and more number of user and which give rise to more and more invention in computer gaming sector. The principles of behavioral psychology are becoming a key factor in interactive learning, the interactive learning is computer based and is popularly known as 'CBT' Computer based learning, e-learning (Learning by use of electronic medium such as web, computer network, or by use of web).

Many of the CBT training modules, e-learning lessons include use of multimedia such as text, video, animation, still photographs, audio, music, graphics, sketches etc. These components are used as per the requirement of the topic and availability of the resources. CBT is more popular in industrial training as this kind of training is provided at a number of places at the same time by using web technology. The cost is required to be incurred at one time and benefit of these training sessions can be taken by large number of users working at different geographical places around the world. The greatest advantage of these systems is that the user can learn the CBT based lesson as per his own convenience at his own pace

The Mass Media Approach

In this phase closed circuit television was used to achieve cost effectiveness and to reach out to a large number of students. So the idea

was to educate more number of students with less number of teachers and trainers. It is still used for various purposes such as expeditions, cultural programs, and medical operations. In this, technology captures an event such as a lecture, or program happening at one place and through technology it is brought before people who are physically at a distant from that event.

When this was invented, the main purpose was to make cost effective learning. The effectively of this technology was heavily dependent upon the quality of the speaker, his delivery style and its relevance to the audience. We can call this phase of a more mechanical in form as emphasis is given on the availability and requirements of technology that is television, camera and its transmission than the needs of a learner. In this method as there was no direct connection between a teacher and learner, there was any feedback to the teacher, we can call it as it was more of a one way communication.

If one look upon the advantages of this phase, then one may find this phase gave a momentum for the use of educational technology. Reaching out to the people became easier; the cost compared to its reach was justifiable. Overall this phase made a strong foundation for use of 'Educational Technology'. The practice of using audio-visual technology was used in that phase extensively by countries like UK and USA. In India also we see programs like 'Country Wide Classroom' on Indian Television (Doordarshan).

In India University Grants Commission has a separate wing called as 'Consortium for Educational Communication' having twenty centers all over India named as Educational Media Research Centre, which produce educational video programs and are transmitted on separate educational channel named as 'Vyas' channel and 'Doordarshan'. Apart from UGC Open universities like Indira Gandhi National Open University, New Delhi, Yashawant Rao Chavan, Maharashtra Open University, Nasik make use of television for higher education.

The same concept in more extended format is still used in many developed countries like U.S.A, U.K., including India. It is called as 'Education Satellite' technology where a person delivers lecture at one place and it is video recorded and transmitted via satellite to number of pre-decided places, where students can watch the lecture and ask questions via video conferencing or by text format and experts answers the questions from his place. Educational Media Research Centre, University of Pune, has the facility of 'Satellite Instructional Television' (SIT) where there is live as well as recorded multicasting of educational programs, and these programs are multicast throughout the Nation at more than hundred places who have downlink facility, from where students can ask questions either by video or text through satellite.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. What are the uses and significance of Educational Technology?

…………………………………………………………………………
……………………..……………………………………….…………
……………………..……………………………………….…………

2. Describe the mass media approach?

…………………………………………………………………………
……………………………………………….……………………
……………………..……………………………………….…………

2.10 LET US SUM UP

In this unit you have learnt need for hardware approach and software approach, role of system approach, significance of educational technology and individual and mass media approach.

2.11 UNIT-END EXERCISES

1. What are the types of approach?

2. Explain the system approach.

2.12 ANSWER TO CHECK YOUR PROGRESS

1. Types of Approach:
    1. Hardware approach.
    2. Software approach.
    3. System approach.

1. System Approach:

    This type of educational technology is related to the concept of systems engineering which owes its origin to computer science. It represents the latest concept in technology of education. In this type and approach, educational technology stands for a systematic way to design, carryout and evaluates the total process of education in terms of specific objectives. Thus, it means a systems approach to organize educational system effectively and economically, keeping in view the educational objectives and available man-material resources.

2. The systems approach takes education as a system having a set of inputs which are subjected to a process, designed to produce certain outputs which are intended to meet the stipulated objectives of the system. The application of this type of educational technology takes the system of education as a whole and views it in the context of the specified objectives and functioning of its interrelated parts and the whole system under the existing constraints. If the system meets the requirements of the system

objectives, it is maintained. If it does not fulfill the specified objectives, it is modified. As a result, various alternative strategies and tactics are explored, designed and implemented and the most appropriate and feasible one is retained.

2.13 SUGGESTED READINGS

1. Alcoholado, C., Nussbaum, M., Tagle, A., Gomez, F., Denardin, F., Susaeta, H., et al. (2012). One mouse per child: Interpersonal computer for individual arithmetic practice. *Journal of Computer Assisted Learning*.
2. Barnes, K., Marateo, R.C. and Ferris, S.P. 2007. Teaching and learning with the net generation. *Innovate: Journal of Online Education*.
3. Bingimlas, K. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science and Technology Education*,
4. Chu, H.C., Hwang, G.J., Tsai, C.-C., Tseng, J.C.R. (2010). A two-tier test approach to developing location-aware mobile learning systems for natural science courses. *Computers and Education.*

UNIT-3 DIFFERENTIAL INSTRUCTION

Structure

3.1 INTRODUCTION

This unit discusses the differential instruction and importance of differential instruction and implication of the UDL for inclusion. Hence, in this unit you are going to learn the different types of UDL and individualized instruction that will help you in the learning process.

3.2 OBJECTIVES

After going through this unit, you will be able to

- Know the differential Instruction
- Understand the importance of differential instruction
- Discuss the areas of UDL and individualized instruction.
- Implication of the UDL for inclusion.

3.3 DIFFERENTIAL INSTRUCTION

Differentiation means tailoring **instruction** to meet individual needs. Whether teachers differentiate content, process, products, or the learning environment, the use of ongoing assessment and flexible grouping makes this a successful approach to **instruction**.

Differentiated Instruction Allows Students to Succeed

- Making Decisions. Which students miss out most? ...
- Meeting Students Where They Are. Designed differentiation is the deliberate act of modifying instruction or an assignment in order to customize the effect to match the particular developmental level and skills of a student or group of students

Differentiated instruction differs from traditional instruction because it caters to the students. The teacher will adjust their lesson plans and curriculum to fit the learning needs of their students. Assessment results are used to help the teacher adjust their classroom as opposed to just giving the student a grade.

DIFFERENTIATED INSTRUCTION: A DEFINITION

Differentiated instruction is effective instruction that is responsive to students' readiness, interests and learning preferences. All three characteristics of the learner—readiness, interests and preferences—allow educators and students to build new learning through connections to existing knowledge and preferred ways of working.

The process of differentiating instruction for students depends on the ongoing use of assessment to gather information about where students are in their learning and about their readiness, interests and learning preferences. Teachers use this information to vary the learning environment, instruction, and assessment and evaluation.

Readiness refers to the student's starting point for learning, relative to the concept being studied. Attention to students' **interests** enhances the relevancy of learning by linking new information to students' experience and enthusiasm.

Learning preferences are the many different ways in which learners prefer to acquire process and work with information. Learning preferences are influenced by gender, culture, the classroom environment, learning styles and multiple intelligences.

By attending, at various times, to a learner's readiness, interests and learning preferences, we increase the likelihood that students will be able to build new learning through connection to existing knowledge and preferred ways of working and that they will be engaged in the learning.

A LONG HISTORY

Differentiated, or responsive, instruction is not new. Concern for attending to the needs of particular students is captured in writings about teaching in ancient Greece and Egypt, in descriptions of life in the one-room schoolhouse and in every instance where instructional plans are adjusted to better meet the needs of an individual learner.

Of course, if it were easy to address individual needs, there would be no need for this brochure! Effective differentiated instruction requires that educators take thoughtful and deliberate actions to address the particular needs of students and keep in mind a number of essential concepts:

Essentials of Differentiated Instruction

- Knowledge of students' readiness to work with concepts, their interests and their learning preferences and seeing all preferences as equally valid.
- Teachers use a repertoire of instructional and assessment strategies to meet the needs of different learners.

- All differentiated instruction activities are equally engaging and respectful and take approximately the same amount of time.
- Unless students are on an IEP, all differentiated instruction is based on the same curriculum expectations and all students have opportunities to achieve the same high standards of performance.
- Students are assessed before, during and after their learning. Assessments inform next steps for both teacher and student.
- Even if students have choices in the ways that they demonstrate their learning, teachers are able to use a common assessment tool (e.g., a rubric) so that all student work is judged against the same assessment criteria.
- A defining characteristic of a differentiated classroom is flexibility. Students work in short-term, flexible learning groups and educators are flexible in creating and altering instructional plans in response to learners.

DIFFERENTIATED INSTRUCTION IN THE CLASSROOM

Differentiated instruction is not individualized instruction. Instead, it involves considering and selecting from a variety of instructional approaches and making frequent use of flexible, short-term groups to address a variety of learner needs and preferences.

Some DI involves prior planning and formalized structures (e.g., designing a choice board or a tiered assignment); some DI requires less prior planning or results from decisions made on the spot based on emerging student needs (e.g., choice of group size, think-pair-share, note-taking options such as a web or outline). SOME EXAMPLES

DI in Geography

Students work in small, readiness-based groups to sort images and written statements into two piles; one representing the characteristics of urban environments, the other of rural environments. Students complete a graphic organizer where, depending on readiness, they either use the sorted images and text to deduce the criteria that distinguish one environment from the other (e.g., differences in population density, types of employment), or they give examples for provided criteria.

DI in English

Students studying effective presentation techniques individually choose to focus on a speaker's use of images; inflection, pitch and pace; level of language and use of written text; or body language. After listening to and viewing an oral–visual presentation, students work in like groups (e.g., interest, learning style) to prepare a list of what they observed. Students then meet in mixed groups to prepare a comprehensive list, graphic organizer, or brief presentation summarizing effective presentation techniques.

DI in Business

Students choose an area of personal interest to develop a fictitious business. The various forms of ownership are explained (e.g., sole proprietorship, partnership, corporation, cooperative, franchise) and students are asked to select the form they think would be best suited to their business. Students then work individually, with a partner or in a small group to research their particular form of ownership and respond to the questions on a provided template. This task might also be differentiated by readiness if questions of greater or lesser complexity are scaffolded according to each learner's needs.

DI in Science

Students participate in a class brainstorm of the possible factors that affect soil composition and fertility. Students individually select the factor that most interests them and then design and conduct an investigation to examine their chosen factor. Mini-lessons are provided on experimental design along with investigation recording forms that support learners according to their needs for more or less structure.

IMPLEMENTING DIFFERENTIATED INSTRUCTION IN THE CLASSROOM

Begin planning your approach to differentiated instruction by referring to the continuum on the left. Consider where you are now and the steps you could take to increase your effectiveness and your responsiveness to learners' needs.

Developing Instructional Routines and Skills

Identify your own learning preferences and those of your students by using inventories, observations in a variety of learning situations and discussion. Deliberately plan part of a lesson so that it appeals to a learning preference that you do not usually address.

Expanding Instructional Routines and Skills

Determine ways of learning that motivate your students the most. Over several days, provide the class with learning experiences that introduce them to different ways of learning and allow you to observe which opportunities work for which students. For example, using a multiple intelligences approach, engage students in learning that is primarily visual/spatial, follow up with opportunities that are kinesthetic and interpersonal, and then provide experiences that focus on logical/mathematical, intrapersonal and verbal/linguistic intelligences. This may be done using a centers/stations approach in which all students have experiences at all centers over a period of several days.

Developing the Routines, Habits and Skills for Differentiated Instruction

Begin by providing a single alternative to a standard assignment, making sure that each alternative is equally respectful, takes roughly the same amount of time and satisfies the same expectations. Later, provide a few alternatives/options, supporting students as necessary as they work at their choices. Create an assessment that will allow you to give meaningful feedback to the student regardless of the choice made, and the student to engage in meaningful assessment as learning.

Sustaining a Differentiated Instruction Culture in the Classroom

Routinely encourage student reflection and involve students in activities that require them to engage in assessment as learning. Talk with students about times they will want to use areas of strength. Challenge students to stretch beyond their comfort zone and experiment with other ways of learning when they are working on concepts that they understand. Along with your students, reflect on what helps to engage them and respond by refining your instructional approaches.

3.4 Universal Design of Learning and Individualized Instruction

Universal Design for Learning (UDL)

UDL is an approach to teaching aimed at meeting the needs of every student in a **classroom**. It can be helpful for all kids, including kids with learning and attention issues. ... Here are just a few examples of how **UDL** can work in a **classroom**.

Universal Design for learning is a set of principles that allow teachers with a structure to develop instructions to meet the diverse needs of all learners.

Recognizing that the way individuals learn can be unique, the UDL framework, first defined by David H. Rose,D.Ed. of the Harvard Graduate School of Education and the Center for Applied Special Technology (CAST) in the 1990s,[2] calls for creating curriculum from the outset that provides:

- *Multiple means of representation* to give learners various ways of acquiring information and knowledge,
- *Multiple means of expression* to provide learners alternatives for demonstrating what they know, and
- *Multiple means of engagement* to tap into learners' interests, challenge them appropriately, and motivate them to learn.

Curriculum, as defined in the UDL literature, has four parts: instructional goals, methods, materials, and assessments. UDL is intended to increase access to learning by reducing physical, cognitive, intellectual, and organizational barriers to learning, as well as other obstacles. UDL principles also lend themselves to implementing inclusionary practices in the classroom.

Universal Design for Learning (UDL) is an approach to teaching aimed at meeting the needs of every student in a classroom. It can be helpful for all kids, including kids with learning and attention issues. But UDL takes careful planning by teachers.

There are three primary principles of UDL:

- Provide multiple and flexible methods of presentation to give students with diverse learning styles various ways of acquiring information and knowledge;
- Provide multiple and flexible means of expression to provide diverse students with alternatives for demonstrating what they have learned;
- Provide multiple and flexible means of engagement to tap into diverse learners' interests, challenge them appropriately, and motivate them to learn. Here are just a few examples of how UDL can work in a classroom.

Posted lesson goals

Having goals helps students know what they're working to achieve. That's why goals are always made apparent in a UDL classroom. One example of this is posting goals for specific lessons in the classroom. Students might also write down or insert lesson goals in their notebooks. The teacher refers to lesson goals during the lesson itself.

Assignment options

In a traditional classroom, there may be only one way for a student to complete an assignment. This might be an essay or a worksheet. With UDL, there are multiple options. For instance, students may be able to create a podcast or a video to show what they know. They may even be allowed to draw a comic strip. There are tons of possibilities for completing assignments, as long as students meet the lesson goals.

Flexible work spaces

UDL promotes flexibility in the learning environment. That's why in a UDL classroom, there are flexible work spaces for students. This includes spaces for quiet individual work, small and large group work, and group instruction. If students need to tune out noise, they can choose to wear earbuds or headphones during independent work.

Regular feedback

With UDL, students get feedback — often every day — on how they're doing. At the end of a lesson, teachers may talk with individual students about lesson goals. Students are encouraged to reflect on the choices they made in class and whether they met the goals. If they didn't meet the goals, they're encouraged to think about what might have helped them do so.

Digital and audio text

UDL recognizes that if students can't access information, they can't learn it. So in a UDL classroom, materials are accessible for all types of learners. Students have many options for reading, including print, digital, text-to-speech and audio books. For digital text, there are also options for text enlargement, along with choices for screen color and contrast. Videos have captions, and there are transcripts for audio.

UNIVERSAL DESING OF LEARNING AND INDIVIDUALIZED INSTRUCTION

Differentiated Instruction and the Three Universal Design for Learning Principles Differentiated instruction is well received as a classroom practice that may be well suited to the three principles of UDL. The following section looks at the three network appropriate teaching methods, recognition, strategic and affective, in order to address the ways in which differentiated instruction coordinates with UDL theory. Certain instructional techniques have been found to be very effective in supporting different skills as students learn. Differentiated instruction is designed to keep the learner in mind when specifying the instructional episode.

Recognition learning: The first UDL principle focuses on pattern recognition and the importance of providing multiple, flexible methods of presentation when teaching patterns – no single teaching methodology for pattern recognition will be satisfactory for every learner. The theory of differentiated instruction incorporates some guidelines that can help teachers to support critical elements of recognition learning in a flexible way and promote every student's success. Each of the three key elements of differentiated instruction, content, process, and product, supports an important UDL Teaching Method for individualized instruction of pattern recognition.

Strategic learning: People find for themselves the most desirable method of learning strategies; therefore, teaching methodologies need to be varied. This kind of flexibility is key for teachers to help meet the needs of their diverse students, and this is reflected in the 4 UDL Teaching Methods. Differentiated instruction can support these teaching methods in valuable ways.

Affective learning: Differentiated instruction and UDL Teaching Methods bear another important point of convergence: recognition of the importance of engaging learners in instructional tasks. Supporting affective learning through flexible instruction is the third principle of UDL and an objective that differentiated instruction supports very effectively.

3.5 IMPLICATION OF THE ABOVE FOR INCLUSION

Inclusive education is the process of strengthening the capacity of education system to reach out to all learners as a strategy to achieve education for all. The world Declaration on Education for All adopted in Jomtien Thailand (1990), set out as an overall vision: Universalizing access to education for all children, youth, adults and promoting equality.

This means being proactive in identifying the barriers that may be countered in accessing educational opportunities and identifying the resources needed to overcome these barriers. Inclusive moves emphasis away from pupils for whom curriculum is modified toward the process of responding to all pupils, acknowledging that any child could have additional support needs at any given time. More impetus for inclusive education was given at the world conference on Special needs education (SNE) on access and quality held in Salamanca, Spain June 1994. More than 300 participants representing 92 governments and 25 international organizations considered the fundamental policy shifts required to promote the approach of inclusive education, thereby enabling schools to serve all children, particularly those with special education needs.

Each child should be included in the main stream schooling without any exclusion due to perceived differences or support needs. An inclusive education system can only be created if ordinary schools become more inclusive, that is, if they become better at educating all children in their communities. The Salamanca conference proclaimed that regular schools with an inclusion orientation are the most effective means of combating discriminatory attitudes, creating welcoming communities, building an inclusive society and achieving education for all.

Differentiated Instruction and Implications for UDL Implementation

• Instruction is concept-focused and principle-driven. The instructional concepts should be broad-based, not focused on minute details or unlimited facts. Teachers must focus on the concepts, principles and skills that students should learn. The content of instruction should address the same concepts with all students, but the degree of complexity should be adjusted to suit diverse learners. Process

• Flexible grouping is consistently used. Strategies for flexible grouping are essential. Learners are expected to interact and work together as they develop knowledge of new content. Teachers may conduct whole-class introductory discussions of content big ideas followed by small group or paired work. Student groups may be coached from within or by the teacher to complete assigned tasks. Grouping of students is not fixed. As one of the foundations of differentiated instruction, grouping and regrouping must be a dynamic process, changing with the content, project, and on-going evaluations.

• Classroom management benefits students and teachers. To effectively operate a classroom using differentiated instruction, teachers must carefully select organization and instructional delivery strategies. In text, How to Differentiate Instruction in Mixed-Ability Classrooms.

Network-Appropriate Teaching Methods

To support diverse recognition networks: • Provide multiple examples • Highlight critical features • Provide multiple media and formats • Support background context

To support diverse strategic networks: • Provide flexible models of skilled performance • Provide opportunities to practice with supports • Provide ongoing, relevant feedback • Offer flexible opportunities for demonstrating skill

To support diverse affective networks: • Offer choices of content and tools • Offer adjustable levels of challenge • Offer choices of rewards • Offer choices of learning context

Implication of model



Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. What is Differential Instruction?

…………………………………………………………………………………
…………………..……………………………………….………………

2. List out the principles of differential instruction.

…………………………………………………………………………………
……………………………………….……………………………

3.6 LET US SUM UP

In this unit you have learnt Differential instruction, universal design of learning and individualized instruction and implication of the differential instruction for inclusion.

3.7 UNITS-END EXERCISES

1. Define - UDL.
2. List out the Essentials of Differentiated Instruction.

3.8 ANSWER TO CHECK YOUR PROGRESS

1. Differentiated instruction is effective instruction that is responsive to students' readiness, interests and learning preferences. All three characteristics of the learner—readiness, interests and preferences—allow educators and students to build new learning through connections to existing knowledge and preferred ways of working.

2. Essentials of Differentiated Instruction

- Knowledge of students' readiness to work with concepts, their interests and their learning preferences and seeing all preferences as equally valid.
- Teachers use a repertoire of instructional and assessment strategies to meet the needs of different learners.
- All differentiated instruction activities are equally engaging and respectful and take approximately the same amount of time.
- Unless students are on an IEP, all differentiated instruction is based on the same curriculum expectations and all students have opportunities to achieve the same high standards of performance.
- Students are assessed before, during and after their learning. Assessments inform next steps for both teacher and student.

- Even if students have choices in the ways that they demonstrate their learning, teachers are able to use a common assessment tool (e.g., a rubric) so that all student work is judged against the same assessment criteria.
- A defining characteristic of a differentiated classroom is flexibility. Students work in short-term, flexible learning groups and educators are flexible in creating and altering instructional plans in response to learners.

3.9 SUGGESTED READINGS

1. Burk, M. (1999). Computerized test accommodations: A new approach for inclusion and success for students with disabilities. Washington, DC: A.U. Software, Inc.
2. Ostroff E. Universal design: the new paradigm. In: WFE Preiser, EO stroff (eds) Universal Design Handbook. New York: McGrawHill. 2001.
3. Theroux, P. (2001). Enhance Learning with Technology. Differential Instruction.
4. Universal design: creating inclusive environments .E Steinfeld, J Maisel - 2012
5. Willis, S. & Mann, L., (2000). Differentiating instruction: Finding manageable ways to meet individual needs (Excerpt). Curriculum Update.
6. Willis, S. & Mann, L., (2000). Differentiating instruction: Finding manageable ways to meet individual needs (Excerpt). Curriculum Update.

UNIT-4 INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Structure

4.1 INTRODUCTION

This unit discusses about the information and communication technology. The national policy on education 1986 as modified 1992, stressed the need employ educational technology to improve the quality of education. The significant role ICT can apply in school curriculum frame work 2005(NCF).The comprehensive choice of ICT for holistic development of education can be built only on a sound policy. Hence, in this unit you are going to learn the ICT scope and significance, characteristics of ICT and psychological principles for ICT among teachers and learner that will help you in the teaching learning process.

4.2 OBJECTIVES

- Know the meaning of ICT
- Describe each of the components of a ICT
- Understanding the Characteristics of ICT
- Discuss the psychological principles for ICT among teachers and learners.

4.3 INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Information And Communication Technology is defined as the use of hardware and software for efficient management of information. i.e. storage, retrieval, processing, communication, diffusion and sharing of information for social, economical and cultural upliftment.

Information and communication technology (ICT) is defined as the implementation of different branches of technology in information and

communication processing. In a broader sense, ICT is taken to refer to the whole set of enabling technology concerned with communication, manipulation of information (hardware and software), networking, data storage, transmission-encompassing data, voice and video.

Concept and Importance of ICT

ICTs stand for Information and Communication Technologies and are defined, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information." These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony. Information and Communication Technologies consist of the hardware, software, networks, and media for collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services.

ICTs can be divided into two components, Information and Communication Infrastructure (ICT) which refers to physical telecommunications systems and networks (cellular, broadcast, cable, satellite, postal) and the services that utilize those (Internet, voice, mail, radio, and television), and information Technology (IT) that refers to the hardware and software of Information collection, storage, processing, and presentation.

For the purposes of this policy, Information and Communication Technologies are defined as all digital devices, tools, content and resources, which can be deployed for realizing the goals of teaching-learning as well as management of the educational system.

According to National Research Council, Learner-centered environment is where "the careful attention is paid to knowledge, skills, attitudes and beliefs of the learners in the classroom".

ICT finds its use in education for the following reasons:

- ICT assists students in accessing digital information
- ICT promotes collaborative learning in a distance-learning environment
- ICT offers opportunities to develop critical thinking skills
- ICT produces a creative learning environment.
- ICT improves the quality of teaching and learning.
- ICT supports teaching by facilitating access to course content.

4.4 SCOPE OF ICT

ICT has a vast scope in the field of education. At all levels of education, whether at school or college, ICT has promising results. These encompass the areas such as teaching-learning in outside the classroom, in regular face-to-face set-up or distance mode. Thus, the scope of ICT in education can be discussed in detail under the following sections.

Use of ICT in teaching-learning process:

The common use of ICT for teaching includes preparation for notes, teaching learning resources and examinations. This does not enable teachers to radically change their pedagogical practices. Teachers need to go beyond such simple use by involving students to use ICT so as to transfer students' learning.

The best way of using ICT by teachers in teaching-learning process is to see that students are motivated to use technology which takes care of concentration on technology or on the teacher at a given time in the classroom.

Use of ICT for publication purposes:

The educational uses of ICT for publication purpose is mainly to disseminate information or ideas and share them with the school community, public, governmental organizations within the country or abroad. These products of publication take the shape of a newsletter, brochure or a website. Students can publish a newsletter by procuring the information related to an organization-Governmental or Non-Governmental. While taking up publishing work, students play roles such as editors, reporters, authors and designers of the newsletter. Later they also plan, design, create and distribute them in and outside the school for the people concern.

Use of ICT in Evaluation:

Evaluation is a significant part of teaching which comprises the learning process and also the provision feedback to learners. Teachers in traditional face-to-face situations use interaction as an opportunity to provide feedback to learners, besides communicating their strength and weaknesses. With the advent of technological developments, there is limited opportunity for face-to-face Interaction.

Now, teacher uses a combination of two forms of evaluation:

Formative Evaluation: This is used as a learning tool, and to give and gain feedback on learner ability and performance.

Summative Evaluation: This is an evaluative method for grading and making a judgment about the participant's achievement in a course.

Formative evaluation can take the form of any one or many of the following types of assignments:

- **Portfolios**: Portfolios are the collection of a student's work over a period of time. They take the form of action plan without comes which is at various stages of implementation; a series of paintings with student self-reflection; or a collection of essays accompanied by an annotated bibliography and critique.
- **Reports, essays and journals**: These belong to specific kind on interest. These are aimed at developing critical thinking skills and

to make judgments about various actions, plans, ideology, movements in history or a discipline specific collection of readings.

- **Case studies and scenarios:** these are used to develop analytical skills based on a specific area or knowledge.
- **Online (asynchronous) conference discussions and synchronous oral examinations**: These evaluation techniques favour learners who are skilled in presenting thoughts and ideas through inter-personal interaction.

Use of ICT for Research purpose:

Products and processes of ICT provide access to a lot of information on innumerable topics produced by people of diverse areas and fields across the globe. This information is either singled out in combination of the form of text, images, sounds, videos, and animation.

For research, sifting through a number of websites in search of relevant, authentic and high quality information is a challenging experience. So, while looking for resources one of the easiest and safest methods of researching is to use directories.

These aspects lead to collaboration of research work in which the different areas or processes of the research project can be shared to produce quality results and achieve the desired goals.

Use of ICT for Administration:

ICT for administration purposes include the preparation of school announcements, reports, letters and student registration. ICT makes the work of the heads of school easy and manageable and document storage saves a lot of space, as physical files are replaced by electronic ones.

Use of ICT for Personal Purposes

At the personal level, ICT is used for communication, personal development and entertainment purpose. Again, most usage will be to search for and store information, and submit online application-subscription, purchase or other personal uses.

Use of ICT for Professional development:

ICT uses for professional development are indicated in searching for information for self-study and communication. This enhances teacher's confidence in their areas of specialization. To further their teaching career, few teachers use ICT and consequently motivate others to use ICT.

4.5 CHARACTERISTICS OF ICT

The characteristics of ICT in education can be discussed in detail under the following headings:

Student-centric:

In these classrooms, students play an active role in their learning and teachers serve as mere guides. They are more facilitators of learning than lecturers. They help students think critically and learn by doing and act as a resource while their students discover and master new concepts. Student-centric classroom environments put students' interests first and are focused on each student's needs, abilities and learning styles.

Computing devices:

Computers are readily available in modern classrooms, since they are essential tools for 21st century students and replace the utilities of pen and paper. They not only give students the means to conduct online research and master the technology skills they need, but they also give teachers the opportunity to enhance their lessons.

The ability to deftly operate a computer is a critical 21st century skill. Computing devices greatly assist in teaching and learning and make them more engaging and effective.

Active learning:

In modern classrooms, students are actively engaged in what they learn. Students participate in more active learning by working in groups or on computers and complete projects and other interesting activities that help them discover new skills.

Students can learn actively by talking and listening, writing, reading and reflecting. When students are encouraged to take an active interest in learning, they are more likely to retain the knowledge they've accumulated.

Adaptive learning:

Any classroom will always have students of different types of learning abilities in it which often makes it difficult for teachers to make sure that all of them understand the concepts.

The modern approach of adaptive learning gives students the freedom to learn at their own pace and in the way they are most comfortable with. There are various kinds of software available for adaptive learning that teachers can use to enhance the learning of their students.

Invitational environment: The classrooms should not be cramped or overcrowded. Modern classrooms should have the basic material required for teaching such as, interactive whiteboards and LCD projectors.

The BYOD (Bring-Your-Own-Device) approach can be adopted, so that students can bring their laptops or tablets to the classroom for better personalized learning. Teaching with technological material is more effective, stimulates student engagement, eases the work of teachers and makes it easy for students to focus on learning.

AIMS AND OBJECTIVES OF NATIONAL POLICY ON ICT IN SCHOOL EDUCATION IN INDIA

The National Policy on Education 1986, as modified in 1992, stressed the need to employ educational technology to improve the quality

of education. The policy statement led to two major centrally sponsored schemes, namely, Educational Technology (ET) and Computer Literacy and Studies in Schools (CLASS) paving the way for a more comprehensive centrally sponsored scheme - Information and Communication Technology @ Schools in 2004. Educational technology also found a significant place in another scheme on up gradation of science education.

The significant role ICT can playing school education has also been highlighted in the National Curriculum Framework 2005 (NCF) 2005. Use of ICT for quality improvement also figures in Government of India's flagship programme on education, Sarva Shiksha Abhiyan (SSA). Again, ICT has figured comprehensively in the norm of schooling recommended by the Central Advisory Board of Education (CABE), in its report on Universal Secondary Education, in 2005.

With the convergence of technologies, it has become imperative to take a comprehensive look at all possible information and communication technologies for improving school education in the country. The comprehensive choice of ICT for holistic development of education can be built only on a sound policy. The initiative of ICT Policy in School Education is inspired by the tremendous potential of ICT for enhancing outreach and improving quality of education.

This policy endeavors to provide guidelines to assist the States in optimizing the use of ICT in school education within a national policy framework.

Aims:

- The ICT policy in School Education aims at preparing youth to participate creatively in the establishment, sustenance and growth of a knowledge society leading to all round socioeconomic development of the nation and global competitiveness.
- It also aims to devise, catalyze, support and sustain ICT and ICT enabled activities and processes in order to improve access, quality and efficiency in the school system.

Objectives:

To achieve the above, the ICT Policy in School Education endeavours to:

Create

- ✓ An environment to develop a community knowledgeable about ICT
- ✓ An ICT literate community which can deploy, utilize, benefit from ICT and contribute to nation building
- ✓ An environment of collaboration, cooperation and sharing, conducive to the creation of demand for optimal utilization of and optimum returns on the potentials of ICT in education.

Promote

- ✓ Universal, equitable, open and free access to a state of the art ICT and ICT enabled tools and resources to all students and teachers
- ✓ Development of local and localized quality content and to enable students and teachers to partner in the development and critical use of shared digital resources.
- ✓ Development of professional networks of teachers, resources persons and schools to catalyze and support resource sharing, up gradation, and continuing education of teachers; guidance, counseling and academic support to students; and resources sharing, management and networking of school managers and administrators, resulting in improved efficiencies in the schooling process
- ✓ Research, evaluation and experimentation in ICT tools and ICT enabled practices in order to inform, guide and utilize the potentials of ICT in school education
- ✓ A critical understanding of ICT, as benefits, dangers and limitations.

Motivate and enable

- ✓ Wider participation of all sections of society in strengthening the school education process through appropriate utilization of ICT.

4.6 Psychological Principles For ICT Among Teachers And Learners

Individual Differences

Best uses of prior knowledge Design effects are stronger for low-knowledge learners than for high-knowledge learners and for high-spatial learner than for low-spatial learners. These learners are equipped to use cognitive strategy to work around cognitive overload, distraction, or other effects of poor design

Multimedia best use of words & pictures Adding graphics to words can improve learning. Students learn better from words and pictures, rather than from words alone.

Spatial Contiguity best placement of words & pictures Placing text near graphics improves learning. Students learn better when corresponding words and pictures are presented near rather than far from each other.

Temporal Contiguity best sequencing of words & pictures Students learn better when corresponding words and pictures are presented simultaneously rather than successively.

Coherence "less is more" Using gratuitous visuals, text, and sounds can hurt learning. Students learn better when extraneous words, pictures and sounds are

excluded rather than included. Less is more: eye or ear "candy" can distract and actually hurt instruction by causing cognitive overload. Visual: Student learning is hurt when interesting but irrelevant words and pictures are added to a multimedia presentation. Sound: Student learning is hurt when interesting but irrelevant sounds and music are added to a multimedia presentation. Words: Student learning is improved when unneeded words are eliminated from a multimedia presentation

Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. Define ICT.

……………………………………………………………

……………………………..……………………………

2. Describe the scope and significance of ICT?

……………………………………………………………

…………………………………………………….……

4.7 LET US SUM UP

In this unit you have learnt ICT meaning and definition , scope and significance , characteristics of ICT and Psychological bases for ICT among teachers and learners.

4.8 UNITS-END EXERCISES

1. What are the aims of ICT?
2. Explain the Psychological Principles for ICT among Teachers and Learners.

4.9 ANSWER TO CHECK YOUR PROGRESS

1. Aims of ICT:

- The ICT policy in School Education aims at preparing youth to participate creatively in the establishment, sustenance and growth of a knowledge society leading to all round socioeconomic development of the nation and global competitiveness.
- It also aims to devise, catalyze, support and sustain ICT and ICT enabled activities and processes in order to improve access, quality and efficiency in the school system.

1. **Psychological Principles for ICT among Teachers and Learners.**

Individual Differences

Best uses of prior knowledge Design effects are stronger for low-knowledge learners than for high-knowledge learners and for high-spatial learner than for low-spatial learners. These learners are equipped to use

cognitive strategy to work around cognitive overload, distraction, or other effects of poor design

Multimedia best use of words & pictures Adding graphics to words can improve learning. Students learn better from words and pictures, rather than from words alone.

Spatial Contiguity best placement of words & pictures Placing text near graphics improves learning. Students learn better when corresponding words and pictures are presented near rather than far from each other.

Temporal Contiguity best sequencing of words & pictures Students learn better when corresponding words and pictures are presented simultaneously rather than successively.

Coherence "less is more" Using gratuitous visuals, text, and sounds can hurt learning. Students learn better when extraneous words, pictures and sounds are excluded rather than included. Less is more: eye or ear "candy" can distract and actually hurt instruction by causing cognitive overload. Visual: Student learning is hurt when interesting but irrelevant words and pictures are added to a multimedia presentation. Sound: Student learning is hurt when interesting but irrelevant sounds and music are added to a multimedia presentation. Words: Student learning is improved when unneeded words are eliminated from a multimedia presentation

4.10 SUGGESTED READINGS

1. Brunskill, E., Garg, S., Tseng, C., Findlater, L. (2010). Evaluating an adaptive multi-user educational tool for low-resource environments. In *Information and Communication Technologies for Development (ICTD) 2010*. London: IEEE Press.
2. Cabada, R.Z., Estrada, M.L.B., Parra, L.E., Garcia, C.A.R. (2011). Interpreter for the deployment of intelligent tutoring systems in mobile devices. *International Conference on Advanced Learning Technologies (ICALT) 2011*, (pp. 339–340). Washington,
3. Cassim, K.M., & Eyono Obono, S.D. (2011). On the factors affecting the adoption of ICT for the teaching of word problems. In Ao, S.I., Douglas, C., Grundfest, W.S., Burgstone, J. (Eds.), *World Congress on Engineering and Computer Science 2011, Vol. 1*, (pp. 269–276). San Francisco, CA: Newswood Limited.
4. Picard, J.M. and Wood, P.F. (2002) ‘An online blended learning approaches to delivering business skills for professionals’, North American Regional Conference of the International Council for Open and Distance Education.
5. Ruhe, V. and Qayyum, A. (2000) Learning through New Technologies, the Response of Adult Learners: Cross-case Report, Vancouver: Distance Education and Technology, University of British Columbia.

UNIT -5 DEVELOPMENT OF ICT

Structure

5.1 INTRODUCTION

In this unit, you are going to learn the development of ICT, stages of ICT and Process of ICT. The important use of ICT in developing collaborative networks for sharing and learning such as Internet , E-Mail, Teleteaching , Teleconference to communicate with families and children in other places.

5.2 OBJECTIVES

- Know the development of ICT
- Understand the importance of Internet and E-mail.
- Define the term Tele-Teaching
- Understand the Teleconference to communicate with the families and children in other places.

5.3 DEVELOPMENT OF ICT

Information and communication technologies for **development** (ICT4D) refers to the application of information and communication technologies (**ICT**) toward social, economic, and political **development**, with a particular emphasis on helping the poor and marginalized. It is often regarded as the use of technology for social.

5.3.1 STAGES:

1st stage (until the second half of the nineteenth century) - "manual" information technology, tools which were: a pen, inkwell, book. Communication impl-Lis hand the conduit through the mail letters, packages, and dispatches. The main purpose of the technology-presentation of information in the desired form.

The 2nd stage (since the end of the XIX century) is a "mechanical" technology equipped with more advanced means of mail delivery, the tools of which were: writing phone, voice recorder. The main purpose of the technology is to present the information in the desired form by more convenient means.

3rd stage (40-60 - IES of XX century) - "electric" technology, the tools of which were: main computers and related software, electrician. typewriters, copiers, portable voice recorders. The main purpose of it begins to move from the form of representation of the investment to the formation of its content.

The 4th stage (from the beginning of the 70s) is an "electronic" technology, the main tools of which are main computers and automated control systems (ACS) and information retrieval systems based on them, equipped with a wide range of basic and specialized software systems. The center of gravity of the technology is shifted even more to the formation of the content side of information for the management environment of various spheres of public life, especially the organization of analytical work.

5.3.2 REQUIREMENT:

Requirements and Challenges of Teachers and Learners teaching computer science involves the imparting of a set of skills and competencies but also the underpinning knowledge of how the concept of computation is played out in the real world. It is necessarily a practical subject that involves the use of computer resources which are both hardware and software that are already in use in school for a variety of purposes. There is a need to explore how computers communicate across networks and with locally attached peripheral devices. Learners need to experience practical problem solving to develop the associated learning.

Programming Languages Teachers and learners need to be able to use several computer programming languages that demonstrate the different language types available. For example: imperative, declarative and functional. What languages are used is a matter for the teacher and their background as they are going to need to teach in a language which fits their experience and competence. Much of the programming software and associated material that is available for Computer Science teaching is either completely license free, is open source or has a licensing scheme for education that is cost free like the Microsoft Dreamspark programme that is free to CAS members3, consequently there is no per user or station cost

for software licenses but only the cost of installation and maintenance. There is also a core requirement by the exam boards for some course work that is carried out within one of a set of prescribed languages (there is a list of accepted languages published by the boards an example of which is given in the Appendix). Which language is used will need to be decided by the teacher responsible for teaching the course.

Workstation and Network Environment

When students are developing software they will invariably create programs that stop responding and halt the execution of the machine they are working with and so they will need to be able to kill whatever process has caused the problem ideally without having to reboot the workstation they are using.

Access to files

When working from day to day students need to be able to manage the versions of the program they are working on. They will probably have at least one major project that they are working on both at school and at home. They need to be able to access their work for Computer Science from both within and outside the school or college without having to carry versions around on USB memory sticks. A version control system is also an important aspect of helping them progress as well as being an important aspect of their learning. Some vocational courses use version control systems such as Git10 as an important resource in teaching and learning as well as an excellent way of enabling students to manage their projects.

Hardware

There will be a section of most courses that involves hardware and a teacher might require the ability to manage devices such as robots, for example Lego Mindstorms11, networking devices, input devices such as the Microsoft Kinect for Windows12 and single board devices such as a Raspberry Pi13 or an Arduino14 boards.

Operating Systems

The teacher will want to be able to demonstrate different operating systems such as Linux, BSD Unix, Microsoft Windows and Apple OSX as well as mobile operating systems like Android, iOS and Windows Phone. The way this is done needs to make the authentication of users and connections to home directories works correctly so that files and information can be easily transferred from the test system to the live network environment.

Infrastructure Challenges for Teachers

A Computer Science teacher in a school will be faced with some challenges when negotiating with their ICT support team over the way the school ICT infrastructure is setup and managed. With an outsourced ICT

service they may face some specific challenges with the way the contract under which the managed service provision is negotiated.

5.3.3 PROCESS:

It enables more efficient **processes**. The first thrust is creating an enabling environment by fostering the **development** of innovative sector policies, strengthening public institutions, and **developing ICT** facilities and related infrastructure and networks.

ICT in the ***Process*** of Teaching and Learning. ***ICT*** enables self-paced learning through various tools such as assignment, computer etc as a result of this the teaching learning enterprise has become more productive and meaningful.

5.4 USE OF ICT IN DEVELOPING COLLABORATIVE NETWORKS FOR SHARING AND LEARNING

Use of ICT in developing collaborative networks for sharing and learning such as

1. Internet
2. E – mail
3. Tele- teaching,
4. Tele conference to communicate with families and Children in other places.

5.4.1 INTERNET

The first workable prototype of the **Internet** came in the late 1960s with the creation of ARPANET, or the Advanced Research Projects Agency Network. ... ARPANET adopted TCP/IP on January 1, 1983, and from there researchers began to assemble the "network of networks" that became the modern **Internet**.

The **Internet** is a heterogeneous worldwide network consisting of a large number of host computers and local area networks. The **Internet** uses the TCP/IP suite of protocols. This allows the integration of a large number of different computers into one single network with highly efficient communication between them.

Internet Features

1. Geographic Distribution.
2. Robust Architecture.
3. Near Light Speed.
4. Universal Access.
5. Internet Growth Rates.
6. The Digital Advantage.
7. Freedom Of Speech.

FUNCTIONS OF INTERNET

When one computer sends data, such as an email or a web form, **its** message gets parsed into small packets that contain the sending computer's **Internet** address, the receiving computer's address, and part of the message. **Internet** Protocol serves several basic **functions**.

INTERNET AND ITS IMPORTANCE.

It is a private computer network that uses **internet** protocols and network connectivity to securely share any part of an organization's information or operational systems with **its** employees. The **internet** is an invaluable tool for communication and information.

TYPES OF INTERNET

Some of the most widely used Internet connections are described below.

1. Wireless. Radio frequency bands are used in place of telephone or cable networks. ...
2. Mobile. Many cell phone and Smartphone providers offer voice plans with Internet access.
3. Hotspots. ...
4. Dial-Up. ...
5. Broadband. ...
6. DSL. ...
7. Cable. ...
8. Satellite.

ADVANTAGES OF INTERNET

- The main **advantage** of the **Internet** is its ability to connect billions of computers and devices to each other. Not only does the **Internet** create convenience in sharing and receiving information between users, another **advantage** of the modern **Internet** is its ability for automation.

DISADVANTAGES OF THE INTERNET

1. Bullying, trolls, stalkers, and crime.
2. Pornographic and violent images. ...
3. Addiction, time waster, and causes distractions. ...
4. Never being able to disconnect from work. ...
5. Identity theft, hacking, viruses, and cheating. ...
6. Spam and advertising. ...
7. Affects focus and patience. ...
8. Depression, loneliness, and social isolation.

5.4.2 E-mail (electronic mail)

E-mail (electronic mail) is the exchange of computer-stored messages by telecommunication. (Some publications spell it *email*; we prefer the

currently more established spelling of *e-mail*.) E-mail messages are usually encoded in ASCII text. However, you can also send non-text files, such as graphic images and sound files, as attachments sent in binary streams. E-mail was one of the first uses of the Internet and is still the most popular use. A large percentage of the total traffic over the Internet is e-mail. E-mail can also be exchanged between online_service_provider users and in networks other than the Internet, both public and private.

E-mail can be distributed to lists of people as well as to individuals. A shared distribution list can be managed by using an e-mail_reflector. Some mailing lists allow you to subscribe by sending a request to the mailing list administrator. A mailing list that is administered automatically is called a list_server.

E-mail is one of the protocols included with the Transport Control Protocol/Internet Protocol (TCP/IP) suite of protocols. A popular protocol for sending e-mail is Simple_Mail_Transfer_Protocol and a popular protocol for receiving it is POP3. Both Netscape and Microsoft include an e-mail utility with their Web_browsers.

ADVANTAGES OF E-MAIL

Email use in schools can increase literacy

Email can assist students with literacy and language learning using email exchanges and online writing exercises. The authentic learning provided by collaboration with peers **gets students excited about school**. When students use email it can also:

- Increase motivation through **self-directed** and **collaborative learning**.
- **Improve literacy** with writing activities geared to authentic audiences.
- Gain comfort with tools and skills essential for today's workplace.
- Facilitate **ESL and foreign language learning**.
- Cultivate knowledge and **cultural understanding** through real-world email exchanges.
- Increased **access to technology**, providing new opportunities for students without home-based access.
- Engage in "**anywhere, anytime learning**" with access from school, library and home.

An international classroom network and wealth of resources inspire the meaningful introduction of **technology to the curriculum**.

When you use email, you

- Engage your students with fun and exciting **real-world learning** situations.

- Address **national and provincial standards** regarding reading & writing (literacy) and technology.
- Participate in award-winning international projects in many subject areas.
- Foster **cultural awareness** through connections to an international community.
- Connect with other educators to **share resources** and ideas.
- **Focus on teaching** with technology rather than time-consuming administrative tasks.
- Reduce the "digital divide" by offering **access to technology** to students without home-based access.

More general advantages of email:

- **You can communicate quickly with anyone on the Internet.** Email usually reaches its destination in a matter of minutes or seconds.
- **You can send letters, notes, files, data, or reports all using the same techniques.** Once you learn how to use your email program, everything is sent the same way.
- **You don't have to worry about interrupting someone when you send email.** The email is sent and delivered by one computer system communicating with the Internet. Although it is put into someone's mailbox, the recipient isn't interrupted by the arrival of email.
- **You can deal with your email at a convenient time.** You don't have to be interrupted when email arrives, and you can read it or work with it when you have the time. Also, you can send it at a convenient time. It doesn't have to be written or sent at a time when you know the recipient will be available. This is what we mean by the term ***asynchronous communication***.
- **You don't have to be shy about using email to communicate with anyone.** Email isn't anonymous-each message carries the return address of the sender-but you can write to anyone with an Internet address. All the messages appear the same to the person who gets the email. The messages are generally judged on what's in them, not where they're from.
- **The cost to you for email has nothing to do with distance, and in many cases, the cost doesn't depend on the size of the message.** Most Internet access charges are based on the number of hours per month you access the Internet, or you pay a flat monthly fee.

5.4.3 Tele- teaching

The teleteaching medium included various technology such as Computer-mediated communication technologies, interactive TV, telephone and telefax, T.V., software, radio, multimedia network, video and smart boards. The technology offered free access to e-content, ebooks, e- images to the whole population scattered in remote geographically areas anywhere, anytime.

Earlier the education was limited to four-walls of a classroom. The teacher played important role in classroom teaching. The students were just the active listeners who completed the tasks assigned by the teacher well in time. The private organizations or schools had the authority for opening educational institution in early times. But today due to educational hub all around in terms of educational centres, coaching centres, DE program, correspondence education system, open learning, universities and schools have seen a new market in this area. Later on telecommunication services have been used in many educational projects such as distance education programs that are mentioned in this paper. The technologies such as data communication, satellite T.V., and interactive T.V are being used in this regard.

Advantages of Tele-teaching

The multidirectional teleteaching introduced the cooperative and collaborative learning through team work. Thus the combination of team teaching with collaborative work gives following advantages

• **Flexible Teamwork**: It promotes team-work by working together in a collaborative manner. Thereby providing cooperation, constructive insight, deep knowledge, feedback and suitable examples for the group.

• **E-Learning**: The lectures delivered, recorded or published online supports students to promote e-learning. One can easily use information communication networks and techniques for accessing the content easily.

• **Improves communication skills:** The healthy interaction between the students and the teacher educators promotes them to expand their vision nationally or internationally. Thus, irrespective of the distance or geographical region, we can share different views, ideas and concepts among themselves.

• **Self-assessment and evaluation:** The students can watch educational videos, clips or lectures delivered by the teacher according to their own pace and individual differences. One can watch as many times according his/her capabilities and thus helps in self-assessment of one’s academic achievements through feedback, assessment or comments.

• **Access anytime, anywhere:** The technology has widen its wings so long that it is possible to connect with anyone anywhere provided one must be on-line or using communication networks synchronously or asynchronously.

Problems hindering Teleteaching

Besides advantages teleteaching may have some drawbacks by incorporating teamteaching in it.

• **Time constraint:** The shared content sometimes allows multiple intersection or interlocking contents. The lecture, content, or images are to be discussed timely as sometimes there may be gap in the discussions. The delay in teacher's lecture contribution would not promote active individual feedback and assessment.

• **Presentation context changes:** Since the multiple access to content sometimes changes the theme, content, or idea of the concept by experts, educationists etc. Thus, it would not be able to judge or to find out the changes content, theme or idea. Or in some cases the same pages are uploaded to the web, or many new groups have submitted to the web or students might have added comments every time login to the portal. Thus, the content might have been changed to different links.

• **Technical problems:** The process of communication in tele-teaching is all through networks and wireless techniques. Any small technical error may cause a huge loss to the content.

• **Milestone:** If the content in the present seminar may not be effectively produced there seems no comment, same like unidirectional method of tele-teaching, where the teacher has to wait for the student's feedback to response to switch on to the next instruction. But by incorporating multi-directionalism to tele-teaching includes proper planning starting from choosing the topic (s) to feedback process.

• **Trained expertise**: The lack of technical staff or trained teachers may not give fruitful results. As non-technical staff will not have supportive attitude towards using tele-teaching.

5.4.4 TELE CONFERENCE TO COMMUNICATE WITH FAMILIES AND CHILDREN IN OTHER PLACES

Teleconferencing means meeting through a telecommunications medium. It is a generic term for linking people between two or more locations by electronics. There are at least six types of teleconferencing: audio, audio graphic, computer, video, business television (BTV), and distance education. The methods used differ in the technology, but common factors contribute to the shared definition of teleconferencing:

- Use a telecommunications channel
- Link people at multiple locations
- Interactive to provide two-way communications
- Dynamic to require users' active participation

TYPES OF TELECONFERENCES

Audio Teleconference: Voice-only; sometimes called conference calling. Interactively links people in remote locations via telephone lines. Audio

bridges tie all lines together. Meetings can be conducted via audio conference. Preplanning is necessary which includes naming a chair, setting an agenda, and providing printed materials to participants ahead of time so that they can be reviewed.

Distance learning can be conducted by audio conference. In fact, it is one of the most underutilized, yet cost effective methods available to education. Instructors should receive training on how to best utilize audio conferences to augment other forms of distance learning.

Audio graphics Teleconference: Uses narrowband telecommunications channels to transmit visual information such as graphics, alpha-numerics, documents, and video pictures as an adjunct to voice communication. Other terms are desk-top computer conferencing and enhanced audio. Devices include electronic tablets/boards; freeze-frame video terminals, integrated graphics systems (as part of personal computers), Fax, remote-access microfiche and slide projectors, optical graphic scanners, and voice/data terminals.

Audio graphics can be used for meetings and distance learning.

Computer Teleconference: Uses telephone lines to connect two or more computers and modems. Anything that can be done on a computer can be sent over the lines. It can be synchronous or asynchronous. An example of an asynchronous mode is electronic mail. Using electronic mail (E-Mail), memos, reports, updates, and newsletters can be sent to anyone on the local area network (LAN) or wide area network (WAN). Items generated on computer which are normally printed and then sent by facsimile can be sent by E-Mail.

Computer conferencing is an emerging area for distance education. Some institutions offer credit programs completely by computer. Students receive texts and workbooks via mail. Through common files assigned to a class which each student can assess, teachers upload syllabi, lectures, grades and remarks. Students download these files, compose their assignment and remarks off-line, and then upload them to the common files.

Students and instructors are usually required to log on for a prescribed number of days during the week. Interaction is a large component of the students' grades.

Through computers, faculty, students and administrators have easy access to one another as well as access to database resources provided through libraries. The academic resources of libraries and special resources can be accessed such as OCLC, ERIC, and Internet.

Administrators can access student files, retrieve institutional information from central repositories such as district or system offices,

government agencies, or communicate with one another. Other resources can be created such as updates on state or federal legislation.

Video Teleconference: Combines audio and video to provide voice communications and video images. Can be one-way video/two-way audio, or two-way video/two-way audio. It can display anything that can be captured by a TV camera. The advantage is the capability to display moving images. In two-way audio/video systems, a common application is to show people which create a social presence that resembles face-to-face meetings and classes and enables participants to see the facial expressions and physical demeanor of participants at remote sites. Graphics are used to enhance understanding. There are three basic systems: freeze frame, compressed, and full-motion video.

Video conferencing is an effective way to use one teacher who teaches to a number of sites. It is very cost effective for classes which may have a small number of students enrolled at each site. In many cases, video conferencing enables the institution or a group of institutions to provide courses which would be canceled due to low enrollment or which could not be supported otherwise because of the cost of providing an instructor in an unusual subject area. Rural areas benefit particularly from classes provided through video conferencing when they work with a larger metropolitan institution that has full-time faculty.

Through teleconferencing, institutions are able to serve all students equitably.

ADVANTAGES OF TELECONFERENCING

Reduces Travel

One of the most-apparent benefits of teleconferencing is reduced travel. Businesses with multiple offices and federal governmental agencies with state offices can hold discussions, share critical information and conduct other meetings with employees through teleconferencing.

Saves Time

Teleconferencing frees up time for company executives to finish tasks and execute assigned roles in their own locations or home bases. Time saved from reduced travel can be used more productively.

Streamlines Costs

During economic downturns, teleconferencing sees a resurgence in popularity as an effective communication and interaction tool. Companies report significant savings in travel and human resource budgets.

Enhances Productivity

Teleconferencing allows dispersed employees to communicate with coworkers at headquarters, conduct long-distance meetings and strategic discussions, and share grievances and other human resource issues. Better employee engagement, understanding of roles and effective use of time lead to enhanced productivity.

Short-Notice Scheduling

Teleconferencing systems and toll-free, dial-in access facilities make it possible for companies to schedule short-notice or ad-hoc employee teleconferencing meetings or discussions.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. What are the stages of ICT?

……………………………………………………………………………

……………………...…………………………………………..……………

…………………………………………………………………………

2. Describe the process of ICT.

……………………………………………………………………………

…………………………………………..………………………………

……………………………………………………………………………

5.5 LET US SUM UP

In this unit you have learnt development of ICT, stages of ICT, Requirement of ICT, Process of ICT, Use of ICT in developing collaborative networks for sharing and learning such as Internet, E-Mail, Tele-teaching, and Tele conference to communicate with families and children in other places.

5.6 UNIT-END EXERCISES

1. What are the internet features?
2. Describe the E- mail and its features.

5.7 ANSWER TO CHECK YOUR PROGRESS

1. Internet Features:
    - Geographic Distribution.
    - Robust Architecture.
    - Near Light Speed.
    - Universal Access.
    - Internet Growth Rates.
    - The Digital Advantage.
    - Freedom of Speech.

2. E-mail (electronic mail) is the exchange of computer-stored messages by telecommunication. (Some publications spell it *email*; we prefer the currently more established spelling of *e-mail*.) E-mail messages are usually encoded in ASCII text. However, you can also send non-text files, such as graphic images and sound files, as attachments sent in binary streams. E-

mail was one of the first uses of the Internet and is still the most popular use. A large percentage of the total traffic over the Internet is e-mail. E-mail can also be exchanged between online_service_provider users and in networks other than the Internet, both public and private.

- Increase motivation through **self-directed** and **collaborative learning**.
- **Improve literacy** with writing activities geared to authentic audiences.
- Gain comfort with tools and skills essential for today's workplace.
- Facilitate **ESL and foreign language learning**.
- Cultivate knowledge and **cultural understanding** through real-world email exchanges.
- Increased **access to technology**, providing new opportunities for students without home-based access.
- Engage in "**anywhere, anytime learning**" with access from school, library and home.

5.8 SUGGESTED READINGS

1. Mills-Tettey, G.A., Mostow, J., Dias, M.B., Sweet, T.M., Belousov, S.M., Dias, M.F., et al. (2009). Improving child literacy in Africa: Experiments with an automated reading tutor. In *Information and Communication Technologies for Development (ICTD) 2009*, (pp. 129–138). Piscataway, NJ: IEEE Press.
2. Oliver, R. and McLoughlin, C. (1997) Interactions in audiographics teaching and learning environments.
3. Olson, D. and Bruner, J. (1974) 'Learning through experience and learning through media', in Media and Symbols: The Forms of Expression the 73rd NSSE Yearbook, Chicago.
4. Rosen, E. (1996) Personal Videoconferencing, Ashland, OH: Manning Publications.
5. Salmon, G. (2000) E-Moderating, London.

UNIT-6 TECHNOLOGY TOOLS AND INTERACTIVE MEDIA

Structure

6.1 Introduction
6.2 Objectives
6.3Technology Tools and Interactive Media
6.4 Use of ICT to simplify record keeping,
6.5 Information management in education administration in special and inclusive settings.
6.6 Let Us Sum Up
6.7 Unit-End Exercises
6.8 Answer to Check Your Progress
6.9 Suggested Readings

6.1 INTRODUCTION

Digital citizenship is an important part of digital literacy for young children. Digital citizenship in the context of early childhood programs refers to the need for adults to help children develop an emerging understanding of the use, misuse, and abuse of technology and the norms of appropriate, responsible, and ethical behaviors related to online rights, roles, identity, safety, security, and communication. Adults have a responsibility to protect and empower children—to protect them in a way that helps them develop the skills they need to ultimately protect themselves as they grow—and to help children learn to ask questions and think critically about the technologies and media they use. Adults have a responsibility to expose children to, and to model, developmentally appropriate and active uses of digital tools, media, and methods of communication and learning in safe, healthy, acceptable, responsible, and socially positive ways. Hence, in this unit you are going to learn the different types of technology tools and interactive media that will help you in the learning process.

6.2 OBJECTIVES

After going through this unit, you will be able to

- Appropriate use of technology tools and interactive media
- Know the use of simplify record keeping
- Describe the information management in education administration in special and inclusive settings

6.3 TECHNOLOGY TOOLS AND INTERACTIVE MEDIA

Technology Tools and Interactive Media

During the earliest years, infants and toddlers interact primarily with people. Their interactions with toys are usually in the context of human interaction as well. They need to freely explore, manipulate, and test everything in the environment. Increasingly in today's world, this includes the exploration of technology tools and interactive media. Children of this age are drawn to push-button switches and controls. Technology tools that infants and toddlers might use must be safe, sturdy, and not easily damaged. If technology is used, it must be in the context of conversation and interactions with an adult.

Allow children to explore digital materials in the context of human interactions, with an adult as mediator and co-player. As with shared book reading, use shared technology time as an opportunity to talk with children, use new vocabulary, and model appropriate use.

Avoid passive screen time. While some parents may claim that baby videos calm an otherwise fussy child, there is little research to suggest that infants and toddlers learn from watching videos. If infants are distressed, they need the comfort of a caring adult, not an electronic toy.

Use technology as an active and engaging tool when appropriate to provide infants and toddlers with access to images of their families and friends, animals and objects in the environment, and a wide range of diverse images of people and things they might not otherwise encounter (photos of children from other countries, for example).

Incorporate assistive technologies as appropriate for children with special needs and/or developmental delays.

Make digital audio or video files to document children's progress.

Digital citizenship is an important part of digital literacy for young children. Digital citizenship in the context of early childhood programs refers to the need for adults to help children develop an emerging understanding of the use, misuse, and abuse of technology and the norms of appropriate, responsible, and ethical behaviors related to online rights, roles, identity, safety, security, and communication. Adults have a responsibility to protect and empower children—to protect them in a way that helps them develop the skills they need to ultimately protect themselves as they grow—and to help children learn to ask questions and think critically about the technologies and media they use. Adults have a responsibility to expose children to, and to model, developmentally appropriate and active uses of digital tools, media, and methods of communication and learning in safe, healthy, acceptable, responsible, and socially positive ways.

6.4 USE OF ICT TO SIMPLIFY RECORD KEEPING

School records are books, documents, files and CD ROM in which is embodied information on what goes on in school (e.g. scholastic, co-scholastic, non-scholastic activities and important events etc), the school plant as well as other relevant information focusing on the growth and development of the school.

The school records are official transcripts or copies of proceedings of actions, events, other matters kept by the school administrator, school records could be viewed as authentic registers or instruments or documents of official accounts of transaction or occurrence which are preserved in the school's office. Therefore, every school must keep certain specified records.

Importance of school records: School records keeping includes the fact that school records tell the history of the school and are useful historical sources.

1. Tell the history of the school and are useful historical sources.
2. Facilitate continuity in the administration and management of a school.
3. Facilitate and enhance the provision of effective guidance and counselling services for students in the social, academic career domains.
4. Provide information needed on ex-students by higher and other related institutions and employers of labour for admission or placement.
5. Facilitate the supply of information to parents and guardians for the effective monitoring of the progress of their children/wards in schooling or performance.
6. Provide data needed for planning and decision making by school heads, ministries of education and related educational authorities.
7. Provide a basis for the objective assessment of the state of teaching and learning in a school, including staff and student performance by supervisors and inspectors.
8. Provide information for the school community, the general public employers as well as educational and social science researchers for the advancement of knowledge.
9. Enable school heads to collate information on pupils and staff for decision making by higher authorities, the law courts security agencies and other related government agencies when occasion demands.
10. Provide a mechanism such as the school timetable for the productive management of time and coordination of school work and activities.
11. Serve as data bank on which both the school head and staff and even students can draw on.

Some Important School Records

• **Admission and Withdrawal Register:** This is a permanent record book into which is entered information regarding the entry and exit, including the details of the education and progress of each pupil that ever passes through the school.

• **Attendance Register:** An attendance register is a book in which the presence or absence of students in a school is recorded on a daily basis. It is a statutory record that must be kept by every school. This record is kept on individual class basis. The class teacher is the custodian of this record.

• **Log Book:** The log book is a historical record of events that have significant effects on the schools' activities.

• **The Visitors Book:** The book is meant for recording the visits of important personalities, including officials and from the ministries of education or other related government agencies or any other school related visitors.

• **Staff and Students' Personal Files:** It is necessary that the school should have as much information on every teacher and student as possible without violating their privacy.

• **Cumulative Record Folder:** Students' cumulative record folder is a storehouse of information on students' cognitive, affective and psycho-motor development.

Students' Report Sheet/Card

1. It keeps data on students' academic performance in termly basis.
2. It assists in monitoring students' academic progress.
3. It is a compliment to cumulative record folders.

Lesson Notes/Plan

1. It gives information on what a teacher plans to teach the students at a period of time.
2. It clearly shows the teachers' level of preparedness and their level of competence.
3. It challenges teachers for the task ahead.

• **Scheme and Record of Work Book**: It reflects estimate of academic work which teachers expect to accomplish in each subject based on number of lessons they will have during each term. Pertinently it shows the ability of the teacher to organize the year's work and his/her resourcefulness and enthusiasm regarding the progress of the pupils.

• Staff Time Book and Movement Book

1. They provide information on when staff report and or close at work.
2. They promote regular attendance and punctuality
3. They help checking truancy and gross indiscipline in staff.

• Transfer and Leaving Certificate: Transfer and leaving certificate is the formal exit of the student after completion of study or leaving during the course of study in a school.

• Library records: The library will have many records like stock register, issue register etc. Many of the routine function of the library can be automated using library management software.

• **Stock register:** it is the record of all equipments and materials available in the school including the laboratories

• Cash Register

1. It is a record of financial transactions in schools.

2. It gives information about income and expenditures.

3. It promotes accountability and prevents corrupt practices.

Potential of ICT in Record Keeping

The usefulness of keeping school records with Information and Communication Technologies (ICT) is for the following reasons:

• **Administrative Efficiency:** One major setback in achieving the educational objective of the secondary education is inefficiency of the principal in keeping some records. With the introduction of information and communication technologies such as computers, digital libraries, e-mail, internet and so on where information are stored and disseminated, principals can do better in keeping records, and become effective and efficient in performing their prescribed roles as administrators.

• Availability of Information: Information and Communication Technologies will help maintain adequate and accurate records in our schools and make it available with ease.

• **Easy Retrieval:** It also leads to easy accessibility and dissemination of information on school records, will become available for national planning, financial budgeting, effective implementation of the educational programs and policies.

School record keeping is all about information collection, storage, retrieval, use, transmission, manipulation and dissemination for the

purpose of enriching communication, decision-making and problem solving ability in the school system. It is therefore necessary that this process be as accurate and accessible as possible. Using ICT in keeping school records will help to facilitate and enhance the administration of the school towards achieving the goals of the secondary education.

6.5 INFORMATION MANAGEMENT IN EDUCATION ADMINISTRATION IN SPECIAL AND INCLUSIVE SETTINGS

Interactions sharing ideas and communications with teachers, parents, alumni and community members become the major part of school management. School management includes admission of students to various courses, assigning subjects and classes to teachers, maintaining records, communicating with parents, preparing various certificates, analyzing various data etc. It should help all the stake holders in participating actively in decision-making process. The functions of a school manager are to manage the school and formulate policies that best suit the needs of the school as well as the overall interests of the students. A manager is responsible for school planning with a view to creating learning environment for their students and nurturing talents. Hence, aside from the time and energy spent in school management, a school manager should have a good understanding of the school itself as well as the trend of education development.

Going without school administration software could be costing your time and effort. Earlier times school administration was run without softwares. But present day we are living in a digital world and needs are changed. Luckily, there are lot of school administration software available free of charge. Some of them are listed below with special reference to Open Admin for Schools.

• **FeKara:** FeKara is all-round school admin software which cannot be treated as free software completely. It covers modern school administration and management software option. It can be used to conduct exams, assignments, budgeting and internal messaging. Major drawback for FeKara is that it is meant for small schools only. Additional data storage and other features are available on payment basis.

• **School Time:** School Time is also a similar type of school administration software .It is also can be upgraded to non-free software to get more benefits.

• **TS School:** TS School short form of Time Software School is a classic powerful tool that offers the basics for schools of all sizes. TS School is good for managing your workforce. TS School offers a student management system and an exam module. Again like the School Time and FeKara TS School also has a paid version which gives more features.

• **Fedena:** Fedena or project Fedena is open-source school administration software that largely focuses on handling records. It is based on Ruby on Rails. It was initially developed by a team of developers at Foradian Technologies. The project was made open source by Foradian, and is now maintained by the open source community.

• **Ascend SMS:** Ascend SMS is entirely free full-program school administration software made for Catholic and Independent schools. Ascend SMS offers a complete package. From offering a health management system for the school nurse to a mobile app for parents to a simple discipline reporting system. Even though Ascend SMS is free for many schools, to avail that facility school has to be listed in their system.

• **School Tool:** School Tool is cloud-based open-source school administration software made for schools in the developing world. It provides educators grade books, skill assessment documents, class attendance sheets, and daily participation journals along with organization features including applications like Google Calendar, and a great report card generator. School Tool was made with Python, and is run on Linux Ubuntu. School Tool comes with its own web server and database. To make sure all the necessary components are installed correctly, it is distributed, through Ubuntu Linux. But there is a drawback for SchoolTool. It is far more a tool for teachers than it is for administrators.

Open Admin for Schools: Open Admin for Schools is once again open source. It is a freely available, open source software package and is licensed under the GNU General Public License. Open Admin for Schools offers software features like attendance, reports, management system; Open Admin for Schools is one of the most comprehensive free and open-source school administration software options available. The owners of the site offer free support for schools in developing countries. Open Admin for Schools is entirely web based tool. Currently several schools use this approach. It is designed to be lightweight both in server resource requirements and in communication bandwidth. It currently has the following features:

- Demographics - It stores student and family information that can be viewed and printed in a variety of ways.
- Attendance - Attendance can be entered either by secretaries in the school office or by teachers in the classroom.
- Report Card System - a flexible reporting system with per subject objectives (up to 20), integrated attendance reporting, etc. All report cards are printed as PDF reports and may include a school logo.
- Online Gradebook to allow teachers to enter marks and assessments online from school or home.
- Parent/Student Viewing scripts to allow parents to view attendance and report cards

- A Fees System (along with Lunch program) to allow charging of student fees, printing of invoices, payments, invoices and export summary transactions to external accounting programs.
- Export/Import Modules - to allow students to easily transfer schools within divisions without re-entry of demographic information. Export of data to other programs via an automated XML based transfer mechanism.
- An Online Daybook to allow teachers to plan and view their lessons/days. Currently, only a very rudimentary function.

ASSISIVE TECHNOLOGY (AT) AND INCLUSION

Inclusive classroom is an important part of equal opportunity in education. Demands for inclusive education have increased and fostered major changes to schooling and education. Students with disabilities are educated alongside their peers within the local community therefore mainstream schools are required to adapt to accommodate a diverse group of students with a variety of needs. Approaches to the inclusion of children and young people into mainstream classrooms, and the identification and recognition of special educational needs, is an integral part of daily school work. The wellbeing and actualization of developmental and learning potential within a diverse student population is challenging. Digital literacy is considered as one of main enablers for the participation in the knowledge society and has to be provided based on the principal of equal opportunity. The educational technology has an important role in facilitating digital literacy of students and teachers. Within the renewal of the Educational Technology Curriculum, the ICT competences had been recognized as important in the process of the formation of teachers' professionalism which is based on autonomy, inquiry, creativity and innovation.

The changes in the student population of students with special needs such as students with disabilities and language issues are having a major impact on changing the learning goals, the teaching methods, and the means of assessment for all students. Teachers today, more than ever before, are teaching more students with special needs, such as students with physical or learning disability, emotional disabilities etc. These teachers working with these populations are not just the special education or special English language acquisition teachers, instead more and more of these students are placed in the general student population with regular teachers. Teacher preparation programs then need to ensure that teachers are educated in special needs pedagogy and assistive technologies as they relate to general education. The educational environment needs to be designed or adapted for all students to have the opportunity for success, even those students who may need modifications and accommodations.

Assistive Technology (AT) devices can decrease students' isolation and allow them to become part of regular subject area classrooms. Assistive technology then becomes a tool that provides a method for an individual who is experiencing a disability or other issue to still participate in a

classroom. The application of assistive technology in schools for students classified as having a disability is required through laws such as Individual with Disabilities Education Act (IDEA). As the inclusive education of all students occurs more frequently within the standard classroom, then it becomes important that the knowledge/experience base for all teachers needs to be expanded to incorporate assistive technology approaches and accommodations.

Assistive Technology - Meaning and Nature

Assistive technology (AT) means any piece of technology that helps a student with or without a disability to increase or maintain his/her level of functioning. These often include laptops with specialized programs, like speech to text, text to speech, graphic organizers and word prediction software.

Assistive technology device means any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability.

Assistive Technology helps people with a various range of cognitive/ learning, and physical disabilities, be it in the home, classroom, workplace and/or community. Assistive Technology is enabling all individuals, of all ages, including those with disabilities, to be more independent, self-confident, productive and better included in everyday life, education, employment and living. A list of digital assistive technology is given in the graphics.

Nature of Assistive Technology

- AT compensates for a student's skills deficits, needs and/or area(s) of disability.
- AT is used to lessen or remove barriers faced by persons with disabilities.
- AT refers to both high- and low-tech tools that allow people of all ages to be more independent self-confident, productive and better included in everyday life, education, employment and living.
- AT offers a wide range of equipment to support participation and learning.
- Improve the speed and accuracy of students' work.
- Reinforce effective classroom instruction and strengthen skill development of students with learning disabilities.
- Help students to 'fit in' with classroom learning and routines
- Motivate students with LDs to set high goals for themselves and to persevere.

Types of Digital Assistive Technology

It is important to understand that not all technologies are appropriate for all individuals. People have their own unique set of strengths, weaknesses, interests, experiences and special abilities. Therefore, a technology that may be a blessing for one person may be useless for another. Similarly, a technology that is appropriate for one purpose in a particular setting may be of little value in another situation. So, when choosing an assistive technology, consider the specific individual, the setting and the task(s) to be performed.

Low-tech Assistive Technology:

Pencil grips, Graph paper, Highlighting pens, Planners, Audio books, Digital clocks and Calculators, Erasable pens, Coloured coding systems and overlays, Tactile and Manipulative learning products and Tape.

Mid to Hi-tech Assistive Technology:

- Digital recorders
- Digital books
- Graphing calculators
- Electronic math worksheets
- Portable or adapted keyboards
- Mobile technology, e.g. tablets, iPods, iPads, smartphones, MP3 players, etc.
- Reading systems that utilize a computer, scanner, and software to "read" scanned book pages out loud, e.g. Kurzweil
- Speech recognition software that allows a computer to operate by speaking to it, e.g. Siri
- Speech recognition system that turn oral language into written text, e.g. Dragon
- Software that predicts and edits words for students who struggle with spelling, e.g. WordQ
- "Talking" calculators that assist students with math challenges
- Mind mapping/outlining software
- Global Positioning System (GPS)

Choosing of AT

From the developmental point of view, the early manipulation of objects and use of tools are of particular importance The possibility of a cognitive impairment must be taken into account when evaluating the user's level of cognitive functioning: careful attention should be given to the evaluation of the cognitive demands that the AT device places on the person. Motivation is very important to support an effective use of AT, for this reason the goals of the potential user should be carefully defined, so that the device application can become meaningful and motivating to the person.

AT is to be successfully used by the end-user when it is appropriate:
• Effectiveness or how well the technology enhances the user's capability
• Affordability or how much it costs to purchase, maintain, and repair
• Operability or how easy the technology is to employ
• Dependability or how long the technology operates without reduced performance or breakdown

Universal Design for Learning (UDL) and Inclusion

The origin of the term Universal Design for Learning (UDL) is generally attributed to David Rose, Anne Meyer, and colleagues at the Center for Applied Special Technology (CAST). Rose and Meyer (2002) reveal the basis of UDL is grounded in emerging insights about brain development, learning, and digital media. They observed the disconnect between an increasingly diverse student population and a "one-size-fits all" curriculum would not produce the academic achievement gains that were being sought. Drawing on the historical application of universal design in architectural (e.g., curb cuts), CAST advanced the concept of universal design for learning as a means of focusing research, development, and educational practice on understanding diversity and applying technology to facilitate learning.

CAST's philosophy of UDL is embodied in a series of principles that serve as the core components of UDL:

- Multiple means of representation to give learners various ways of acquiring information and knowledge
- Multiple means of expression to provide learners alternatives for demonstrating what they know
- Multiple means of engagement to tap into learners' interests, challenge them appropriately, and motivate them to learn.

The term "universal design" means a concept or philosophy for designing and delivering products and services that are usable by people with the widest possible range of functional capabilities, which include products and services that are directly usable (without requiring assistive technologies) and products and services that are made usable with assistive technologies.

Advantages and Limitations of AT

Advantages of AT

Assistive technology can help to support and enable people with memory problems including Alzheimer's disease and other forms of dementia to live more independently.

For example, assistive technology and telecare can help to:
• Remind the persons to take their tablets at the right time.

• Help locate a lost item.
• Orientate the person that it is day time or night time.
• Assist the person to phone a relative or friend using preprogrammed numbers or pictures.
• Switch on the lights automatically if the person gets up at night time.
• Switch off the gas automatically if it has been left unlit.
• Alert a career or monitoring centre that the person needs assistance.

Assistive technology may also help to support and reassure careers. For example, it may free careers to spend better quality time with the person. Or it may enable a career to get a good night's rest, knowing that if the person gets up at night they will be alerted.

Limitations of AT

Assistive technology may not be the answer for everybody. People have different additional career support or services rather than using technology at all.

If assistive technology does not meet the individual needs and preferences of the person it may be ineffective or may even cause additional confusion or distress.

For example, assistive technology and telecare may not be the answer if:

• The person switches off or unplugs the equipment
• The person is confused or distressed by any alarm sounds or recorded messages
• There are insufficient careers or care workers to respond to an alert.

Assistive technology on its own cannot provide human contact and personal care. Many older people experience loneliness and social isolation. Technology should only be provided as an addition to contact and care, not as a replacement.

Check Your Progress
Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

3. What are the Technology Tools?
…………………………………………………………………………
…………………………………………………………………………

4. What are the advantages and disadvantages of Assistive Technology?
…………………………………………………………………………

6.6 LET US SUM UP

- In this unit you have learnt different types of technology tools and interactive media, Use of ICT to simplify record keeping, information management in education administration in special and inclusive settings.

6.7 UNITS-END EXERCISE

1. What is meant by assistive Technology?
2. Describe Potential of ICT in record keeping.

6.8 ANSWER TO CHECK YOUR PROGRESS

1. Assistive Technology (AT) means any piece of technology that helps a student with or without a disability to increase or maintain his/her level of functioning; these often include laptops with specialized programs, like speech to text, text to speech, graphic organizers and word prediction software.

2. **Potential of ICT in Record Keeping:**

The usefulness of keeping school records with Information and Communication Technologies (ICT) is for the following reasons:

• **Administrative Efficiency:** One major setback in achieving the educational objective of the secondary education is inefficiency of the principal in keeping some records. With the introduction of information and communication technologies such as computers, digital libraries, e-mail, internet and so on where information are stored and disseminated, principals can do better in keeping records, and become effective and efficient in performing their prescribed roles as administrators.

• Availability of Information: Information and Communication Technologies will help maintain adequate and accurate records in our schools and make it available with ease.

• **Easy Retrieval:** It also leads to easy accessibility and dissemination of information on school records, will become available for national planning, financial budgeting, effective implementation of the educational programs and policies.

School record keeping is all about information collection, storage, retrieval, use, transmission, manipulation and dissemination for the purpose of enriching communication, decision-making and problem solving ability in the school system. It is therefore necessary that this process be as accurate and accessible as possible. Using ICT in keeping school records will help

to facilitate and enhance the administration of the school towards achieving the goals of the secondary education.

6.9 SUGGESTED READINGS

1. American Association of School Librarians & Association for Educational Communications and Technology (1998).
2. Anaya, G. (1999). College impact on student learning: Comparing the use of self-reported gains, standardized test scores, and college grades. Research in Higher Education, 40(5), 499-526. [3] The California State University (2006). Information competence initiative web site. Retrieved June 4, 2006.
3. Cabada, R.Z., Estrada, M.L.B., Parra, L.E., Garcia, C.A.R. (2011). Interpreter for the deployment of intelligent tutoring systems in mobile devices. *International Conference on Advanced Learning Technologies*
4. Information literacy for student learning: Standards and indicators. Retrieved June 5, 2006 from onpower/InformationLiteracyStandards.
5. Rose, D. & Meyer, A. (2002). Teaching every student in the digital age: Universal design for learning, Alexandria, VA: Association for Supervision and Curriculum Development, 2002.

UNIT-7 MULTIMEDIA

Structure

7.1 INTRODUCTION

In this unit discuss about the Multimedia is media and content that uses a combination of different content forms. Multimedia is usually recorded and played, displayed or accessed by information content processing devices, such as computerized and electronic devices, but can also be part of live performance. Hence, in this unit you are going to learn the multimedia approaches and different types of projected aids that will help you in the learning process.

7.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the meaning of multimedia
- Understand the nature of multimedia
- Describe the approaches of multimedia
- Explain the types of instructional aids

7.3 Multimedia – Meaning & Definition

Definitions and Meaning

Weidong Xhang (2003) says that multimedia is a hot topic in education because it represents the latest technology and introduces into the classroom whole new ways of thinking about curriculum, interactions with students and even the nature of learning itself. He elaborates that the meaning of multimedia has changed from meaning nothing to everything. Multimedia can mean any kind of file or document, either a text or spreadsheet that have audio / video effects or "an interactive information café". Whatever it is not, it certainly is the most promising technology in education.

Packiam (1986), has referred to the use of appropriate and carefully selected varieties of appropriate and carefully selected varieties of learning experiences which when presented to the learner through selected teaching strategies will reinforce and strengthen one another in such a way that the learner will achieve predetermined objectives in an effective way.

7.4 Nature Of Multimedia Approach

Multi ⟶ Many

Media ⟶ Techniques or methods

1. Multimedia approach uses a number of media, devices, and techniques in the teaching learning process.
2. Multimedia approach has come out of researches and experiments in educational technology that have been undertaken in order to improve the prove of teaching – learning.
3. Multimedia approach aims at providing meaningful learning experiences via a mix of media in order to achieve predetermined objectives.
4. The choice of the media has to be done carefully so that one does not hamper or reduce the effect of the other i.e. each media must complement the other.

5. The media have to use sequentially and judiciously. Only necessary ones are to be used. Then it would be possible to make optimum use of them in a most economical manner.
6. In multimedia approach, several media and techniques are used as powerful means of communication.

7.5 Multimedia Approaches

Classification of Media used in Multimedia Approach

The multimedia approach is an approach that uses a combination of media or strategies. Based on the methods, strategies, mode of instruction or mode of mix the media are classified in the following manner.

Classification of Media in Terms of Methods and Strategies of Teaching

Media

Methods	*Strategies*
1.Lecture method	i) Team teaching
2.Demonstration method	ii) Microteaching
3.Discussion method	iii) Simulated teaching
4. Lecture-Demonstration method	iv) Workshops
5.Heuristic method	v) Group discussions
6.Project method	vi) Seminars
7.Problem-solving method	vii) Symposia
8.Inductive – Deductive method	viii) Conferences
9.Laboratory method	ix) Brainstorming
10.Analytic synthetic method	x) Counseling
11.Question – answer method	xi) Buzz groups
12.Assignment method	xii) Providing practical experiences

Classification of Media on the basis of Means of Mass Communication

Media

Means of Mass Communication

Radio | Television | Distance Education | Open School & University | Internet

Classification of Media on the Basis of Teaching Aids

Media

↓

Teaching Aids

↓

Graphic	3D Aids	Projective Devices	Mass Communication
1. Charts	1. Models	1.Projectors OHP, LCD, Slides	1. Radio
2. Flash cards	2. Specimens	2. Filmstrips	2. T.V.
3. Posters	3. Puppets	3. Motion Picture	3. Satellite Communication
4. Graphs	4. Living and Non-living objects	4. slides	
5. Diagrams		5. TransparencieS	
6. Maps			
7. Pictures			

Procedure for Adopting Multimedia Approach

Multimedia approach calls for the use of more than one media in the teaching - learning process. It is imperative that a judicious mix of the several possible media available needs to be done. The following figure shows the 6 steps to be followed while adopting the Multimedia approach.

First stage: In this stage the teacher initiate the teaching – learning activities. He sets the ball rolling by delivering a well prepared lesson based on the objectives formulated. He could use a variety of media for his presentation.

Second stage: In this stage, the teacher demonstrates a specific and specialized unit using a mix of media. The teacher may provide learner with programmed learning materials, cassettes, CD's etc.

Third stage: this is a preparatory stage for the learner before he starts independent learning. The student discusses with peer students and teachers his plans of action

Fourth Stage: In this stage the learner actively participates. He uses a variety of media and materials in his self-study.

Fifth Stage: In this stage the learner integrates theory with practice.

Sixth Stage: In this stage learner finds that teaching – learning activities have to be organized on a higher level. He is involved in critical analysis, critical evaluation and exchange of ideas.

Role of Teacher in Multimedia Approach

The teacher has to make a lot of modifications and adjustment if he has to adopt multimedia approach. His role would have a

different connotation compared to the traditional role. He would have to make these changes:

1. The teacher has to adopt a number of methods and techniques; he cannot be satisfied with the lecture or the chalk-talk method.
2. The teacher has to be aware of the different available media and their availability. The teacher should be physically competent to use and demonstrate the use of different media.
3. The teacher should be skillful enough to make a judicious choice of media and be competent enough to mix them sequentially and in an orderly manner.
4. The teacher's role is that of a facilitator or manager of activities. He has to lead his students for independent, individualized learning.
5. The teacher should provide experience such that the students can link practice and theory and integrate them.

7.6 PROJECTED AIDS

PROJECTED AIDS

The different types of projected aids are described below. Films Advancement in the field of science and technology has placed before the teacher many useful and interesting items which if used rightly in the class rooms, can work wonders. Cinematographer is one of them. The financial difficulties of the schools hinder their maximum use in the schools Efforts are afoot to provide such facilities in the schools.

The films make the concept clear to the learners. Then they are able to learn it realistically and in a much effective way. Films really useful and suitable for the school children have now caught the attention of film manufacturers and producers. The Government is also encouraging them for producing worthwhile films really useful to influence the emotions of the children.

7.6.1 COMPUTERS

Purpose of Computers in Education

Computers are one of the most valuable resources in a classroom because they serve so many useful functions. With computers and the internet, students today have a wealth of information at their fingertips that can help them develop their research and communication skills while preparing them for a future career in a workforce that is increasingly reliant on computer technology.

One of the most common applications of computers in education today involves the ongoing use of educational software and programs that

facilitate personalized online instruction for students. Programs like iReady use computers to assess students in reading and math. Students then work on interactive reading and math lessons that are designed to target the specific academic needs identified during diagnostic testing. Educational software like this makes it easier to differentiate instruction so that lessons meet each student's unique learning needs. These tools also provide a wealth of useful data and resources that teachers can use to work with their students in the classroom and maximize learning. Online assessments are more efficient than traditional paper testing because it allows for more immediate feedback and data.

Benefits of Computers in the Classroom

The benefits of using computers in the classroom goes beyond more efficient assessment and opportunities for online learning. Mobile devices and technologies are an inevitable part of society, but that does not mean that students naturally understand how to use those technologies appropriately. Using computers in the classroom gives teachers an opportunity to teach digital citizenship skills that demonstrate ways to use technology correctly and responsibly.

Computers also help maximize student engagement. Modern students are regularly exposed to technology outside of the classroom. Most use and enjoy smart phones and other mobile devices, which is why they are more likely to engage in the learning process if it involves something to which they are already accustomed and enjoy.

Teacher Use of Computers in the Classroom

Computers have revolutionized the teaching profession in multiple ways. Teachers use computers to record grades, calculate averages, manage attendance and access data on student performance in online programs and assessments. Computers have also made it easier for teachers to vary their instructional delivery. Instead of lecturing at the front of the room for an entire class period, teachers can incorporate technology into their lessons to keep students engaged while appealing to a variety of learning styles. From using computers to create presentations on a topic to showing video clips that complement the lesson at hand, technology helps teachers make the content easier for students to understand.

Disadvantages of Computers in the Education Field

While the benefits of using computers in education are plentiful, it also has some disadvantages. Some worry that computers are distracting because they provide students with temptations like games, videos or chats that can take them off task. It's true that some students might be lured off task by these tempting features, but luckily there are settings available that can help teachers and parents set restrictions to help minimize distractions.

Another disadvantage of computers in the classroom is over-reliance on technology. Critics argue that spell check and other computer features that automatically correct errors in spelling and punctuation make students too lazy to learn and apply the rules themselves. These features, however, help point out where students went wrong and offer valuable learning opportunities that can help students enhance their understanding of appropriate spelling and punctuation. The benefits of using computers in the classroom outweigh any disadvantages that may accompany it.

7.6.2 PROJECTOR

A **projector** is an output device that can take images generated by a computer or Blu-ray player and reproduce them by projection onto a screen, wall, or another surface. In most cases, the surface projected onto is large, flat, and lightly colored. For example, you could use a projector to show a presentation on a large screen so that everyone in the room can see it. Projectors can produce either still (slides) or moving images (videos). A projector is often about the size of a toaster and weighs only a few pounds.

How is a projector used today?

- In simple language, a projector basically adopts the operational principal of image projection whereby the projector accepts a video/image input, processes it with the assistance of its inbuilt optical projection system consisting of a lens & optical source and projects the enhanced output on the Projection screen.
- ***A projector is an optical device that projects a figure or picture onto a surface***. This surface is usually light in color and it may be a projection screen, white screen or sometimes a wall. Projectors may be used as an alternative to a television or monitor in large gatherings.

For example: – A projector could be used to demonstrate a presentation on a big screen so that each one in the sitting area (may be a classroom or a conference room) can see it. Projectors can produce either still images like slides or moving images like videos. Often, projectors are about of toaster sized and weigh only a few kgs.

Types of a Projector

On the basis of its display property, Projectors can be classified in three types. They are:

- Cathode Ray Tube (CRT)
- Liquid Crystal Display (LCD)
- Digital Light Processing (DLP)

Cathode Ray Tube (CRT)

A CRT projector is basically a video projecting device. It uses a tiny cathode ray tube which has high-brightness for image generation. A Lens is kept in front of the CRT face which focuses the image and enlarge it onto a big projection screen.

A CRT projector focuses on the image or video by its lenses to project it on screen. These images are processed with help of three separate colored (red, green and blue) CRT tubes.

CRT projectors are not portable as they are huge in size and heavy in weight. Their electricity consumption is also high because of three light guns. At initial stage, it may be difficult and tricky to set up a CRT projector, but the users say that a CRT projectors have a brilliant and outstanding picture quality. People say that these projectors are nevertheless than newer technologies and are compatible with new improvement.

Liquid Crystal Display (LCD)

The meaning of Liquid Crystal Display is approximately clear from its name. The word LCD resembles two states of matter, the liquid and the solid. A Liquid Crystal Display uses liquid crystal to project an image or object.

These types of display panel is generally used in computer, Laptops, TVs, portable video games and cell phones. Displays in LCD technology are much thinner as compared to CRT technology.

Digital Light Processing (DLP)

Digital Light Processing (DLP) is a video innovation made by Texas Instruments that is utilized for front and back projection units. DLP is used in both back and front projections. It is regular for back projection in TVs and also utilized in front projectors for units intended for organizations and classrooms.

A DLP comes in two noteworthy structures i.e. 1 chip DLP and 3 chip DLP. Digital Light Processing makes utilization of micro mirrors called a Digital Micro mirror Device to reflect light and shading onto a screen. These micro mirrors are situated in a semiconductor chip and are little. Most of the DLP chips are manufactured by Texas Instruments.

How a Projector Works

A projector is an optical gadget that projects a picture (or moving images) onto a surface, usually a projection screen. Most projectors create a photo through projecting a bright light via a small lens. However, some newer types of projectors can project the image directly, by using the usage of lasers.

Applications of a Projector

The applications of Projectors include:

In Classrooms

Projectors are used in schooling area for describing a topic. With the aid of a projector, videos or photograph become more enjoyable and children can easily learn by fun way. Further, we can easily zoom-in or zoom-out the image to clear the vision and to search minor points.

In Companies
Projectors are used in big MNC's and enterprises for meeting, presentation and conference purposes.

At Home
Projectors are even used as home theaters that permit you to see the movie or any serial on a massive display with a first-rate sound nice, which makes you feel like you are staring at live.

Advantages of Projector
The advantages of Projectors include:

Large Picture Size
Front projectors generate the largest viable photo size. You can use them to create very large display screen experience of a business film theatre in your own home. Most projectors produce stunning pictures at sizes of 90″ to 120″ diagonal, which is far large than something you can get with flat screen TVs or rear-projection TVs.

Best Alternative for Large Screen Television
A projector is a cheaper substitute for a 60″ plasma TV. The projected picture is typically very bright and projectors can be used with some of the room lights on.



Low Cost
Front projectors can be the least high-priced alternative for big display screen video in your home. Some projectors are constructed for devoted domestic theater and they have now dropped below $1,000, this price makes a good deal; less steeply priced than flat screen TVs or rear-projection TVs.

Given the low price of many entry-level projectors, this is the least expensive way to get a big screen experience at your home. Though you

may have to attach an additional speaker, yet the experience you get is much better compared to price.

Space Saving

A small projector that is set on a rear shelf or bookcase or on the ceiling takes up no floor space in the room. When not in operating mode, it is hardly visible.

Easy To Install

They are lightweight, and one person can pull it out of the box, hook it up and get an image on the wall with little trouble.

Disadvantages of a Projector

The disadvantages of Projectors include:

- A dark room is very often required to use a projector.
- It requires maintenance on regular intervals.
- Installation Cost can be more in some cases as it depends upon how you get it installed.
- Most of the projectors need a separate audio system.

7.6.3 The educational films are mainly of the following types:

Film for the Class Rooms:

This type of films is directly related to class room teaching. Thus we have films for teaching change of seasons, circulation of blood etc. there are films for general information which may not be directly related with the curriculum. Then there are films for demonstrating a skill, e.g., the films on how to use a flannel board in the class room? And then there are films which dramatize an event or episode concerning the life of an individual.

Educational films such as 'A Visit to a Big City of India' celebrations of 'Diwali in Amristar', Mahatma Gandhi, Rabindra Nath Tagore; Ramayana etc. may be shown to the students. Then they are asked comprehension questions or they can be asked to describe something or write as a piece of composition. They can also be asked to speak something for five minutes on the film they have seen. All this will improve the different abilities of the students such as thinking, speaking, explaining, comprehending, reasoning etc. the students can have extra practice when they have got TV's and V.C.R's at their homes.

Films Library:

In each educational institution, there can be one section where they may have a number of educational films. Educational films can be prepared on the basis of best institutions, best teaching-learning situations, and life stories of great men, education of different levels and so on and so forth.

Then in one part of the library some cabins can be made with facility of ear head phone in each cabin. There should be library study period of students as per their convenience. During library periods, some students can see educational films by sitting in the cabins without disturbing others.

Thus educational films can serve many useful purposes. Learning by the students will be real and hence/will last for longer. It will modernize the system of education.

Newsreels:

They are also produced by the Government of India. Some important news of the country is made to reach the masses through such films. It may be on some current event of our own country of some other countries etc. This type of films acquaints the people with the latest happenings.

Documentary Films:

The documentary films are also produced by the Govt. of India. Here the Govt. tries to cover a wide variety of subjects. Usually the social themes are the basis of preparing such films.

Method of showing a film:

Films provide lot of useful information to the learners apart from their recreational value. But they need be shown properly in systematic way. Before showing a film, the teacher himself should know well the contents of that film. He should make preparations for showing it. For this, arrangement of a projector, operator, dark room etc. should be made well in advance.

After showing the film, there should be open discussion, where the students should be free to seek clarifications of their doubts, or they may put questions as they like. In this way, the desired aims of teaching through films can be achieved.

Advantages

The different types of films have a number of advantages which are explained below:

1. Educational through films adds variety in the methods of teaching.
2. Generally the students love to see a film as compared to listening to somebody. In this way, the films are self-motivating for them.
3. With the help of films, the students are able to see many things which otherwise they would find difficult to see. The reason being that this is comparatively cheaper.
4. The films help in developing the imagination of the students.
5. They also reduce the load of work of the teachers. Surely, the teacher relaxes when the learners are shown some film.

Limitations

1. Showing a film to the students is costly, because there is need of film-projector. And every school may not be able to have it.
2. There is need of technical trained staff. And that is generally not available in the school.
3. When a film is being shown, some students want to put a question but that is not possible. Later on, those very students may find difficult to put the same questions.
4. There may be some site or situation which the students want to see for more time, but that is not possible.

7.6.4 Film strips:

Film strips are more flexible than cinema and so they are quite useful in many respects. They are available especially for teaching and more directly associated with the classroom. They are used on a slide projector or a film strip projector. They can be successfully used for composition lessons.

These film strips were not popular in Indian schools in the past but now they are gaining popularity.

7.6.5 Opaque Projector (Epidiascope):

This instrument is an improvement upon the Magic Lantern because the preparation of slides reduces the utility of the magic lantern, in epidiascope there is no need of making slides. Any diagram, picture or even opaque object can be directly had on the screen.

It is a very useful type of visual aid. Sometimes the diagrams given in the book is rather difficult to draw. Moreover, it takes a few minutes to draw the same diagram on the black board. The diagram so drawn on the black board may not be accurate. In such cases, the opaque projector is of much value. The book is placed in the projector with the page of depicting the diagram so that it is reflected and then projected on to the screen.

The Epidiascope serves two purposes:

(a) When it is used to project any opaque object, it works as an epistle scope.
(b) When it is used to project slides (with the help of lever) in that case it serve as a diascope. Because of these two purposes this instrument is named as epidiascope. The working of this instrument employs the principle of horizontal straight line projection with a lamp, plain mirror and projector sense. In it is fitted a high power bulb whose light falls on the opaque object. Over the object there is plain mirror fixed at 45 angle which reflects the light in such a way that it passes through the projection tense. With the result a magnified image of the object appears on to the screen.

The epidiascope serves many useful purposes in the class room situations. Suppose some student has very good hand-writing on his note-book and the teacher wants to show it to the whole class. If he shows the note-book to the student's straight way, it is not properly visible to everyone. He places that note-book with that page of good hand-writing open in the epidiascope, switches the instrument on and that hand writing of the student appears on the screen.

All the students sitting in the class can see it properly and they can learn from it

Many things how they can improve their own hand writing.

Overhead Projector: It is another useful and more convenient way of using black board. In case of black board work, generally it is seen that the teacher stands in front while writing and thus his writing on the black board is obstructed.

The students can't see it properly. Moreover, the teacher has to stand as he is writing on the black board. Besides the teacher has to rub it off occasionally. All these drawbacks can be overcome in case of overhead projector. It can also be used successfully in a class having a large number of students. The overhead Projector can be used in any type of room. There is no need of a dark room for this purpose.

7.6.6 Slides or Transparencies:

A slide is usually a piece of film in a frame for passing strong light through or to show a picture on a surface. It may be a small piece of thin glass to put an object on for seeing under a microscope. It may be made of cellulose acetate film, translucent paper, glass etc. the slide is mounted individually in a projector and strong light is passed through it. The picture or diagram or image on the slide appears on the screen from where it can be seen by the learners.

The slides serve many useful purposes I the class-room situations. Sometimes a slide is prepared for some difficult diagram or picture appearing in the book. The different type of slides serves many useful purposes. Micro slides are prepared for Biological Sciences. According to Hass and Packer (1954), the following are the advantages of slides:

(i) Attract attention
(ii) Arouse interest
(iii) Assist lesson development
(iv) Test students' understanding
(v) Review instruction
(vi) Present next lesson or subject
(vii) Facilitate student teacher participation.

A few other advantages are:

(a) Details of the subjects or the diagram can be shown very nicely with the help of slides of larger size.
(b) They can be procured easily and at low cost.
(c) Their handling and storing is not difficult.

From where to get slide:

Preparation of a simple slide is not a difficult job. Every teacher should learn how to prepare a slide for himself. Here below is given the outline for preparing a simple slide.

1. At first, the base material for preparing the slide is selected. That basic material can be a plain glass, etched glass or translucent paper.
2. A rough layout is laid down. The basic illustration is sketched and letters or other symbols are marked.
3. The glass or cellulose acetate on which slide is to be prepared is placed over the original sketch or layout. But using a drawing pen or marked pencil, the figure is traced out.
4. For better illustration, colour may be added or some art work may be done.
5. Then the transparent sheet is attached to the back of a card board mount with the help of pressure sensitive tape.

Photographic Slides

The Photographic slides can be produced with the help of a suitable camera where photographs of the objects or the diagrams are taken. In this age of science and technology the photographic slides are ready within a few minutes.

Slide Projector (Magic Lantern)

It is a simple type of hardware aid because its mechanism is very elementary. It is used to project slides. That is why it is also called slide projector. The magic lantern help in showing the magnified image of the transparent object called slide on to the screen. The slide is placed inverted in the slide carrier of the magic lantern and its erect image is projected on the screen.

Suppose the teacher is teaching the students about some diseases, their origin, effects etc. he can prepare slides on T.B., Malaria, Cholera etc. and show the same to the class. Another example: a teacher teaching some groups of learners about Mughal Period, he can show slides of Mughal art. It will make teaching more interesting and better learnable for the students.

Points to be kept in mind while using a Magic Lantern (Slide Projector):

In order to use the magic lantern successfully, the following points should be kept in mind:

1. Just showing slides to the students is only visual representation of things. The teacher should give a commentary side by side. It would be better if the teacher tells the students first what they are going to see in the next few minutes. That will make the learners psychologically prepared for the work in hand.
2. Some slides may not be self explanatory type. The teacher should give a running commentary.
3. After showing the slides, the teacher should encourage common discussion. Doubts of the students, if any, can be clarified there. Their problems of any type are also solved.
4. The teacher should not disallow or discourage the students putting questions.

Advantages

1. It is a simple device easy to handle with the help of white magnified objects may be shown on the screen.
2. Any school can afford to have it as it is not costly.
3. The picture on the screen can be allowed to remain there as lot as the learners wish.
4. There is no wastage of time and energy.
5. It is very handy and can easily be taken to any class room or place where it is to be used.

Disadvantages

Undoubtedly the magic lantern is of immense value for the class room teaching, its shortcoming cannot be ruled out. It has a few limitations which are as under:

1. The glass slides are becoming costlier now. It may not be put to excessive use.
2. Every kind of material cannot be projected by the magic lantern.

7.6.7 SMART BOARD

A Smart Board is an interactive whiteboard; think a fancier version of blackboards. It can project images you interact with by writing on it or moving it around. This allows teachers to show subjects in a way that all students can understand easier.

It's connected to a computer and works with a projector. Instead of a mouse, the boards are touch screens, so you can use your fingers to move things around on it. They usually come with different colored pens that you write with on the board.

A Smart Board is not the end all be all for education. You still need good teachers who can use them to their full potential.

9 Benefits of Smart Boards

The idea about smart boards is that students who grew up with the internet are able to learn in a way that's more familiar than how teaching was done before.

1. You are Able to Accommodate Different Learning Styles

Using Smart Boards allow teachers to teach in different styles to their students. There are students who are more verbally inclined, so they can listen to the teacher talk.

Visual learning students can understand what the teacher is doing easier. The board allows more in-depth visuals as well.

Students that learn with their hands can touch the board and work out the problem themselves.

2. Smart Boards Are Interactive

This may be the best part about these boards. Students do better when they are fully engaged, and hands-on learning is the best way to do it. Because it's a touch screen, multiple students can use the board at once. This means they can work together to solve the problem while building relationships with one another.

3. Low Maintenance

These are very easy to use and don't need a lot of maintenance. They also make less of a mess because there's no chalk or markers are involved.

4. Having Online Resources

Being connected to a computer allows teachers to use the internet to enhance their lessons. This could mean going to websites, using videos, or images to help students understand the lesson better.

This also means the students have access to these resources. They can complete a project or research much easier than before.

5. Environmentally Friendly

These boards cut down the need for paper immensely. No longer will teachers have to give handouts to students for them take notes from. Instead, they can pull up the lesson on the board and students can take notes from that.

6. You Can Save Your Lessons

It will take less time to start lessons every day because you can save your lessons on the computer. All you have to do is click on it and you can be at the same place you left off the day before.

You will no longer have to wait for students to take out all their papers, write the lesson on the board, or deal with students who may be confused as to where you left off.

7. Better Visuals

Because it's connected to a computer you have more options in how your lessons look.

For example, you can highlight, bold, or italicize important words in lessons. This will grab students' attention and they will focus more on those points.

You can replace long wordy lectures with more visual learning tools. You can show students the examples instead of trying to explain it with words.

Or maybe there's a video that would work better than a lecture. You can easily pull it up and play it for your students.

8. Technology Integration

Using these boards allow other technology to be used in addition to it. This can include microscopes, cameras, the Smart Notebook app, and more. The Smart Notebook app allows you to run your lessons on any smart board.

9. Proven Success Rates

Studies have shown that using this technology in classrooms have proven success rates. It raises test scores, improves learning, enhances literacy, boosts attentiveness, and increases comprehension.

Teachers report that their favorite benefit is of the Smart Board is that it increases student engagement. Because the boards allow for different types of learning, students feel more confident in raising their hands and helping other students.

7.6.8 E- FLASHCARDS

Paper flashcards used to play an important role in both teaching and learning. With the revolution in the edTech industry however, digital flashcards become more and more popular. eFaqt is an online study tool that offers digital flashcards. We asked our top student and teacher user how they combine digital flashcards with classroom education.

Digital Flashcards: How Students And Teachers Use Them

Education, just as everyday life, becomes more and more digital. Think about the use of digital boards, tablets, and apps in the class room. Digital flashcards are among the solutions that are becoming increasingly popular in the USA and lately also in Europe. Their original version, paper flashcards, has been used since the 19th century to help students actively memorize and recall information. Until a few years ago flashcards were typically hand written or printed and carefully cut out from paper.

With the recent rise of the education technology industry however, more and more companies provide tools to create digital flashcards. eFaqt.com, one of the top online flashcard tools, asked its most active users how they use digital flashcards to tackle their own education challenges.

7.6.9 EDUCATIONAL TOYS

Educational toys (sometimes called "**instructive toys**") are objects of play, generally designed for children, which are expected to stimulate learning. They are often intended to meet an educational purpose such as helping a child develop a particular skill or teaching a child about a particular subject. They often simplify, miniaturize, or model activities and objects used by adults.

Although children are constantly interacting with and learning about the world, many of the objects they interact with and learn from are not toys. Toys are generally considered to be specifically built for children's use. A child might play with and learn from a rock or a stick, but it would not be considered an educational toy because 1) it is a natural object, not a designed one, and 2) it has no expected educational purpose.

The difference lies in perception or reality of the toy's intention and value. An educational toy is expected to educate. It is expected to instruct, promote intellectuality, emotional or physical development. An educational toy should teach a child about a particular subject or help a child develop a particular skill. More toys are designed with the child's education and development in mind today than ever before.

An educational toy is any toy that provides a child with an opportunity to learn – it effectively stimulates learning. It can help develop a particular skill, or teach a child about a particular thing. It also, most importantly, provides fun.

The Benefits of Providing your Kids with Educational Toys

- Play is fun – any learning through play is enjoyable; from an infant discovering his hands or sucking on a toy to a school-age child playing with a bat and ball.
- Educational Toys help in sensory development – from bright coloured rattles for a baby to craft activities for older children which help develop fine motor skills
- These toys teach valuable life lessons – including cause and effect; like playing with blocks: building a tower then knocking it down.
- They retain a child's interest – the child will want to play with them over again.
- Educational toys can help grow a child's IQ – through memory retention, motor skills development, coordination, and even literacy and numeracy.
- Educational toys can build social and emotional development – playing with others, sharing, bonding, taking turns, leadership and teamwork; all of these build confidence.

Children learn by playing, being active, being with others, exploring and discovering, using their imaginations, by being challenged mentally and

physically, and by being shown new things. Educational toys are very helpful in these endeavours.

7.7 Non-projected Aids

The different types of non-projected aid are detailed here below:

(i) **Graphics**: Graphics are related to writing, drawing, painting etc. they are vividly descriptive. For example, maps, diagrams, graphs, atlas, charts tec.
(ii) Three dimensional aids are models, globe, specimens etc.
(iii)**Display Board:** Any type of board on which something can be displayed and the students may consult and be benefited. For example, pocket Board, Flanne Board, Bulletin Board, Magnet Board, Fixo Graph Board., etc.
(iv)**Audio Aids:** those aids which can be heard. For example, Tape Recorder, Record Player etc.
(v) **Charts**: A chart is another software aid used quite frequently in the instructional process. It is defined as "a visual symbol summarizing or comparing or contrasting or performing other helpful services in planning subject maker." A chart is commonly used aid very 'popular with teachers under training though actual class room teachers use it rarely.

According to Mckown & Roberts; charts are analytical in nature, they depict the sequential arrangements or inter relationships of their various elements."

Haas and Pacher say; Charts are the "spark plugs" of visual training, "they" make dry and often meaningless facts more understandable and interesting."

7.7.1 Charts are of various types. Each one of them meets a specific need. Let us now see the different type of charts and the utility in the teaching-learning process.

(i) **Table Chart**: Table Chart means a chart, on which some table is given. It may have a list of rulers and battles in chronological order. For example, a table chart may have the minimum and maximum temperature of a city/region for the last 10 days. We can prepare a table chart of tenses for teaching English.
(ii) **Tree Chart:** As the name indicates, we have a trunk of the tree and its branches. In the same way, we can have charts showing the growth of a thing. This type of charts is quite useful in the teaching of science and social studies.
(iii)**Flow chart:** This type of chart is shown by rectangles, circles, lines, arrows, colours etc. to represent the structure of a big institution. Thus control of education in Haryana State can be depicted as;
(iv)**Comparison or Contrast Chart:** Any type of comparison or contrast between two persons, places, countries etc. may be

depicted on a chart by using columns. Thus we may have a comparison of illiterate people in different states of India. We may ‘have such a chart of comparison showing maximum and minimum temperature of big cities. This type of charts makes the process or teaching-learning easy and more effective.

Pupil Achievements Chart: this type of charts give a comprehensive and detailed information of a student. A cumulative record card is an example of this type of charts.

(v) **Isotope Charts**: In this type of charts, symbols are used for the thing to be represented. ‘The symbols are easy and can be understood. We can use this type of charts for the younger children who are unable to understand the graphs.

(vi) **Pie Charts**: In a Pie chart, a cirque is drawn which represents the whole. Then the circle is divided into segments were each segment represents a percentage of the whole. Many things can be taught with the help of a pie chart. Thus we can teach the students the percentage of various gases in the atmosphere.

Pictures: Pictures are one of the most common type of visual aids. Here the generally, accepted meaning of picture is readymade or machine are pictures. We fan have these from some old magazine or purchase from the market. According to the old Chinese saying “A picture is worth ten thousand words.” The idea is ‘that if we explain something to say 15 or 20 minutes to the students, it can be forgotten. But anything visualized through a picture, has its impact for a longer time.

Through pictures, we can illustrate a story of some accident, an activity, a sight, a place etc. Now the question arises: Can we use a bazaar made picture for teaching a class? Yes. Why not? Our purpose is teaching and for this we can use readymade pictures.

Pictures may be used in the class room situations where actual objects are not available or they are beyond the reach of the teacher due to one reason or the other. While using pictures, the teacher should ensure that they really serve some purpose. Suppose the teacher wants to teach about the Headmaster’s office or punishment being given to the students in these cases actual situations or places should be shown. Bringing pictures for these things will not help. It rather dilutes teaching. So pictures for the sake of pictures should not be used.

Atlas and Maps: Atlas is a very useful teaching aid. It is used in teaching social studies. In atlas different maps of countries are given. The map may be on the basis of roads, railways, district, states, etc. Blank maps are also available along with the filled up maps. The students are taught consulting of maps and filling up of blank maps. This type of activities is very interesting for the school children especially while studying social studies.

This type of visual aid has the following advantages:

1. It is an activity which motivates the students and makes them learn things interestingly.
2. Whatever is learnt in this way is retained by the students for a long time.
3. The students associate the material with the different situation of the map. Thus they are able to understand well.

Globe: Globe is a round shaped wooden or plastic model of earth on which different countries of the world are shown. It revolves round a central axle called Dhuri which shows that the earth moves and it moves around the sun.

Globe is used for teaching History and Geography to the students. Many topics of Geography are well taught with the help of a globe. It makes the subject matter fully clear to the students.

The different countries of the world can be shown simultaneously to the students. Thus a better comparison can be made between the different countries.

Diagrams: Diagrams help the teacher in teaching many things clearly. The diagrams can be drawn on the Black board. The diagram can also be shown on the charts. Diagrams are used for teaching Science, Geometry, and Geography etc. Simple types of diagrams help the students learn things in a better way.

Expert black board writing can draw the diagram on the black board and teach there by. The teacher may also use a chart showing some diagrams. Overhead projector can also be used for showing some diagrams. In that case, the teacher prepares the diagram on a glazed sheet at home. Opaque projector can also be used for showing some diagram straight way from the book.

The diagram should be drawn as simple as possible. They must be according to the mental level of the learners.

Graphs: A graph is an important visual aid. Graphs are used while teaching subjects like Science and Geography. Comparative values can be shown very clearly on a graph paper. When the students see the different graphs, they can at once compare things and pick up the main points easily and very clearly.

Models: A model is usually the miniature structure of the original object. It shows almost all the details of the original thing. It may be of the same size or larger or smaller than the thing it represents. It is a three dimensional recognizable imitation of an object. As compared to a picture or a chart which are two dimensional, the model is three dimensional. It can be seen from different angles and so it is

generally more interesting and instructive. They are used as great deal in the teaching of science. They can also be used for teaching other subjects.

According to Edgar Dale: "A model is a recognizable imitation of that real thing with an increase or decrease in size as the chief difference."

Haas and Packer say: "Models include the replicas of significant units used in manufacturing or operation usually copied on a smaller or larger scale".

Mckown and Roberts say: "Models are replicas of objects house, engine, boat, aeroplane bridge etc. These models may be operating a pump; solar system or water wheel or Don operating a simple weapon, animal, tool or table."

The models are of the following types:

(i) **Scale Models:** This type of models represent the things through exactness of scale. In certain learning, situations, we need correct representation of things. For example the students of engineering are to be shown of Bhakra Dam. For them, scale model will be needed.

(ii) **Simplified Models:** This type of models show roughly the external form of object. For example, models of animals, birds, etc. are all simplified models. Thus the teacher shows to the small children the models of elephants, parrot, horse etc.

(iii) **Cross Sectional Models or Cutaway Models:** This type of models show the interior side of the object a long with the exterior side. This type is used for teaching the senior students. For example, model of an aeroplane is shown to the students of military science. Both the exterior and the interior vision of the aeroplane are needed to be shown to theses learners'.

(iv) **Mock-ups:** Mock-ups is a special form of model. It may not be similar to the original in appearance. It is an imitation of a thing in certain aspects only. Here some element of original reality is highlighted to make it more meaningful to the students.

Thus we can tell the students about trains, aeroplanes, ships etc. by making their mock-ups with card board. In technical institutions, mock-ups are often used for the purpose of training.

Utility in the Teaching-Learning Process

In the class room teaching, many times it is not possible to show to the learners the actual objects. They may be too big, they may be too afar, they may be dangerous etc. So in those situations, their models according to requirements of the learners are brought and show to the learners. For example, the students are to be taught about a dam, it may not be possible to take them to the dam for firsthand experience in that case its model is shown. Second situation Bhilai, it may not be possible to take

them 50 far, their models serve the purpose of teaching. Third situation, the students are to be taught about the lion, snake, which are dangerous animals, their models will be used for teaching. Fourth situation, certain things may be invisible for example, the interior parts of an eye. In such cases, out way model is used to make the learners fully understand it.

7.7.2 Flash Card and Flannel Board

Flash cards: Flash cards are pieces of card board on hand paper on which a word or words are written on some picture is drawn.

They can be shown to the students at any time. Moreover, they can be shown for less or more time depending upon the teacher. They can be successfully used for a number of purposes e.g.

Word Recognition: A flash card bearing a word of a sentence may be shown to a group of students or to some individual.

Team competitions: Class may be divided into two teams. The flash cards may be shown to the groups by one. They will try to read out as quickly as possible.

Training in Speaking: Some questions may be written on the flash cards. The cards are shown to the student's one by one. They are asked to speak out the answer.

Teaching writing: They can also be used in teaching writing. By writing beautifully on them, they can also be used for improving the handwriting of the students.

Match cards: Flash cards in serve the purpose of match cards. In match cards, we have flash cards in pairs. They are displayed on the flannel board. The students watch them carefully.

Then they are asked to match them rightly e.g. we have different flash cards for the words book, child, watch woman books, children, watches, women etc. they are mixed up. Then the students are asked to match these flash cards, may be according to the number/plurals or genders etc.

Order Cards: Flash cards may carry words or expressions which mean some sort of order. These flash cards are shown to the students one by one and they may be asked to carry out the orders. For example, we have flash cards with the words or expression- sit stand, go out, come in, come here, go to the black board, bring chalks, call the peon etc. These are shown to the students and they act accordingly.

Flannel-Board (Felt Board): It is a wooden board on which flannel is fixed. The different flash cards on the back of which flannel is fixed, can be placed on the flannel board. It is really a very useful, versatile and exciting aid.

The flannel board is not just an aid itself. It is, in fact, that type of aid which helps the other aids. A few other aids can be adapted to be used with the flannel board. In the hands of a creative and hard working teacher, it can probably be the most useful and exciting and available next to black board. It can be used for teaching spellings, reading of English, formation of sentences, picture composition etc.

7.7.3 Bulletin Board

It is aboard of soft wood or cork. It is used for pasting papers, pictures of paintings. It displays announcements, records news items, newspaper cuttings, illustration etc.

This type of board helps in popularizing any idea. The board is generally placed at some important place in corridors or in the classroom. The bulletin board is useful not only for teaching learning purposes but it also brightens the look of the school.

Pocket Board: It is wooden board on which pockets are made with about 11/2 inch wide cloth wrapped from one corner to the other parallel to the base of the board. The pockets so formed are meant for holding the flash cards. Anything written on the flash cards may be hung in the pocket of the board and then removed by the teacher at any time.

If we want to use flash cards in the pocket there is no need of fixing up flannel at the back of flash card.

7.7.4 The Magnet Boards

The magnet boards are used by the commercial firms to display something. They are a bit costly. Their use in Indian school has not started as yet.

The magnet board is a display board made up of a milky glass sheet. There are four magnet strips spread over length-wise. Iron letters form the material to be displayed. If tube lights are fixed at the back of the glass, the material will be visible even at nights.

The Fixo Graph Boards

It is an evenly perforated plywood board or asbestos board painted in black colour. Plastic letters of different sizes are fixed into the perforations to display the matter. The letters may be of red colour or white. Quantitative data may be displayed on them.

7.7.5 Chalk Board

The chalk board is one of the oldest and easily available software aids in the schools. No doubts, a lot of progress has been made in various fields on account of advancement by Science and Technology, it is still a popular aid in the instructional process. If this aid is used properly, it

becomes the most valuable device for making instructions concrete and comprehensive.

The chalk-boards may be of hanged type, roller type; fixed type etc. usually we have fixed boards in the class room. In subjects where too much in continuation is to be written roller board is recommended. In ordinary situations, fixed black board is all right. What type of colouring of the chalk board is more suitable? The experiments have proved that the use of white chalks and black surface are more suitable. We may have green boards.

Chalk boards may be of different types;

(a) Wall Boards

(b) Wooden Boards on Stands

(c) Roller Boards

(d) Graph Boards

(e) Map Boards.

How to Use the Chalk Board

1. While writing on the chalk board, the teacher should start from the top left hand corner and continue writing till the lower end is reached. The systematic and uniform writing captures the attention of the students.
2. Whatever is written on the chalk board, it should be correct.
3. Whenever a new lesson/subject is started, it should be rubbed off and start afresh.
4. Lengthy drawings and sketches should be avoided. That will obstruct teachers' attention to the class for a longer time.
5. While writing the teacher should stand aside on the left. His own standing before the chalk board should not be any obstruction for the learners.
6. Sometimes a part of the chalk board is not visible to the class because of the reflection of light. That should not be used by the teacher.
7. The style of writing on the chalk board should be correct. The writing on the board must be reasonably good.

Advantages of Chalk Board

1. If a teacher goes on speaking in the class finishing up the syllabus, his teaching becomes dull and monotonous. Many things may not be properly understood by the learners. The use of chalk board adds variety to the teaching on one side and on the other side it makes the lesson more clearly to the students.

2. Some sketches or diagrams can be drawn on the chalk board. While teaching science subjects, some diagrams or sketches have to be drawn on the chalk-board.
3. In a language period, spellings of the words when written on the chalk board simplify things.
4. A teacher who is an expert in chalk board work is able to work wonders in teaching. He need not use a chart or pictures. He can draw these on a roller chalk board and use the same in teaching. Thus it is economical in many ways.
5. While teaching, the teacher often goes on writing the summary of the lesson on the chalk board. It helps him in quick revision of the whole lesson in hand.
6. It is very flexible type of aid. The teacher man uses it any way he likes according to his interest and liking. Sometimes when the teacher is not in a mood to write anything on the chalk board that does not matter. He can very easily avoid usage. The total control of writing on the chalk board is in the hands of the teacher.
7. The chalk board is the heart and the soul of teaching Mathematics. The teacher as to use if for solving the sums.

7.7.6 Tape Recorder

No doubt, it is a very expensive type of audio aid, but it is quite useful. It is helpful to the teacher in many ways. Now improved models of the tape recorder are in use throughout the world. It comes under the category of Hardware aid.

Advantages:

1. The tape recorder is an extension of a lecturer's work. When the teacher feels tired, he can teach vigorously by recording his voice with the help of a tape recorder.
2. It can be used for title improvement of pronunciations. The students can listen to the recorded programmes, speeches and thus improve their own pronunciation. Sounds, stress, intonation etc. can be taught by using a tape recorder.
3. The tape recorder can be used in learning music. The learners can record their performances and then discuss the same with their teacher.
4. It can be used for self-examination, self-criticism and self-education.
5. It can be used for giving a commentary on a slide or film strip.
6. It can be used for giving drills to the students.

Limitations:

1. It does not function when electricity supply fails.
2. It needs careful handling as it is very delicate and can be out or order soon.
3. It is an expensive aid. Some schools may not afford to purchase it.

7.7.7 Record Player

Undoubtedly it is an expensive aid but it is of great advantage in the class room situations. Some records are available on which well known speeches are recorded. Listening to this type of records can prepare the students for becoming good speakers. There are gramophone records on which the poem and prose passages are recorded. In the same way these are records for teaching stress, intonation etc. of English language. While teaching English different type of records can be successfully used in the class rooms.

A record player can be used for teaching spellings of English words. For this purpose some records are available on which words along with spellings are spoken. These records can be used for that type of students who are ear-minded.

The record player works wonders in the class rooms where music ad defacing are taught to the students. The students can learn singing by imitating the records. They can also dance according to the tunes produced on the record player.

Use of Radio, T.V and Newspaper as Teaching Aids

Radio, T.V. and newspaper are commonly available in almost every home may be a village or a city. They are used for different purposes mainly for entertainment and knowing what is going on all around within the country or outside on this earth. In schools and colleges, their significance is becoming unique. They are very useful teaching aids. In the hands of a good teacher, they contribute handsomely to the class room teaching-learning programme. Even at their homes, the students are able to derive a lot of benefit with their up to date knowledge in different spheres.

7.7.8 Radio:

Radio is a very common type of hardware aid. It is an unparalleled vehicle, for mass communication. It is now recognized as an education medium that reaches millions of interested listeners. Its use for: educational purposes were tested in English in 1924. Later on Canada and Sweden, tried in 1926 followed by the experiments made by Switzerland in 1930 and by India in 1930, with the result many educational institutions of the West started using radio for instruction purposes, though in India, the number of such institutions was limited.

The radio programme for the schools become popular very common now with A.I.R and B.B.C. Radio programmes for the schools became popular during the period from 1950's to 1970's. A large number of cities and rural schools started using radio in class room teaching. Generally the radio installed in the library or common room of the school and it is under the degree of one of the teachers.

A number of Akashwani stations (about fifty four) broadcast programmes for the school-children. These programmes are for

(i) Teachers
(ii) Children of Higher Secondary Classes
(iii) children of primary Classes
(iv) General enrichment programmes for young children etc.

The themes and topics of the programmes for different type of audiences are planned by the Akashwani stations. They have advisory committees for this purpose whose personnels concerned with education is represented fairly. Mostly the Akashwani stations produce educational programmes for their broadcasts. NCERT, New Delhi, CIEFL, Hyderabad, and CIIL, Mysore also produces some educational programmes which are used by Akashwani stations.

Highlighting the importance of the radio George Waston says: "Radio is not an addition to education. Radio is something to be placed on top of education. Rather, radio is education." Commenting upon the use of radio as an instruction aid, R.G. Raynolds writes: "Radio is the most significant medium for education. As a supplement to class room teaching its possibilities are almost unlimited. Its teaching possibilities are not confined to the five or six hours of the school day. It is available from early morning till long after midnight. By utilizing the rich educational and cultural offerings of the radio children and adults in communities however remote, have access to the best of the world's stores of knowledge and art. Some day its use as an educational instrument will be as common place as text books and black boards."

Types of Programmes

Many types of radio programmes are broadcast such as children's programmes, women's programmes, religious, agricultural and commercial programmes, variety show, drama, music, quiz contest programmes etc. besides, there are educational programmes on various topics in different subjects. Generally there are radio lessons for the following subjects:

Science: There are talks on scientific inventions and interviews with the leading scientists and research scholars. Sometimes new developments in various branches of science are highlighted.

Languages: The learners can improve their pronunciation of English by attending raido programmes broadcast in English medium. Sometimes, we have a lesson on teaching of a poem. Presenting dramas and stories of famous writers is another feature of the radio.

Social Studies: We have dramatization of historical events, acquaintance with the lives of great men etc.

Music: National songs and other interesting musical items can be heard on the radio. These types of programmes arouse feelings of national unity.

A Radio Lesson

The Radio broad cast can be used:

(i) To introduce a new lesson
(ii) To prevent a complete lesson
(iii) To review the previous lesson.
(iv) To solve major problems occurring in a lesson.

Preparation: The teacher should find out beforehand from different sources about the lesson to be broadcast, its timings, any accessories if needed. He should tell the students how they will be benefited by the lesson. Then the different aids needed for the lesson should be got prepared-preferably with the help of the students. Seating arrangements of the students be made in a circle or semi-circle. The radio should be placed facing the students at a nearby distance. The teacher must make sure the working of the radio, the availability of electricity. If possible, provision of a generator should be there.

Both the actual broadcast, everyone should be seated properly. The different aids are displayed as per their utility in the class room situation.

Presentation of Broadcast. The radio lesson being broadcast is presented to the class. The teacher takes down a few points on his piece of paper/or note book side by side. The students may also write down some hints or points in their note-books side by side.

In fact, the students are asked beforehand to take down any query, doubt, question on their note-books for which they can consult the teacher later on.

Discussion: Immediately after the broad cast, the teacher discusses the lesson thoroughly with the students. Their doubts are classified and questions are answered. Whatever problems about the lesson are raised by the students, their solutions are given by the teacher. The outcomes of the lesson are highlighted.

Follow Up: As a follow up, the teacher may give the students some working assignment, hold an oral test to find out their understanding of the lesson.

In cases some suggestions are put forth by anyone from the class attention is paid to the same.

Advantages of Radio Lessons

1. Radio brings subject experts and other great men in the class room. Lectures, talks and addresses of important personalities from any corner of the world can be heard on the A.I.R.
2. A single broadcast can be heard and understood by a large number of students at a time. The cost of per capita of the listeners is very small and is almost negligible.
3. The class room instructions are supplemented by radio programmes. The routine and monotonous type of class room environment is ended.
4. The general knowledge of the pupils is widened. They are able to have extensive knowledge of many things.
5. The radio becomes a very important medium for leisure time activities.
6. The radio lesson helps the students in the improvement of pronunciation, speech and language.
7. It develops critical thinking of the students.
8. The voice of the speaker on the radio is heard by the children and they are attracted towards it. It is really very impressive and life like for them.

To sum up Fedric Wittis says, "Like to think of education by radio as a timely, vital, dramatic thing, as system operating or acquiring more information, a means of widening one's horizon or enriching one's life and breaking down prejudices through inspiration and not prescription, an education by desire and not by discipline; a pattern of slowly changing pictures, events with keen interpretations, not statistics and formulas; a moving panorama of the world in which we live right now, while we are living in it – not a dreary drill of text books and tests. In short, I feel that one of the broadcasting's most useful contribution to education and one of its responsibilities to itself and its listeners is the popularizing of education itself."

Limitations

But radio lessons have some limitations also which are as follows

1. The broadcast is one way communication. The students cannot get the doubts clarified. They cannot put any question. Only the teacher can help and that too after the broadcast is over.
2. Every time, the time of broadcast does not suit the school or the class.
3. No doubt, home assignment can be given by the radio lesson. But correction is not possible. Only the class teacher has to do it.
4. The financial problems are there in the way of the educational use of the radio. The number of receiving sets is inadequate.

Whatever may be the drawbacks of the radio lesson, its utility and extraordinary advantages cannot be ignored. The teacher should try to make fullest use of the radio programmes. Radio is, undoubtedly, a force in

education with vast potential. In the words of K.N. Srivastva: "The radio is full of promise for the future of education."

7.7.9 Television:

Like radio, television is also a means of mass communication. Its advantage over the radio is that it appeals both to the ear and the eye. It has been described as the queen of audio-visual aids. It combines photo and voice. It is said to be the 'electronic black board of the future.' Of late; its utility in educational process has been recognized.

It has now become powerful means of communication of ideas all over the world. For making it really useful, the teacher inculcates among the pupils good viewing habits, critical and attentive listening. He also psychologically prepares them to receive the information from the television. After the lesson also, he plays his role as per needs and, requirements of the learners.

The teacher is given a guide sheet for each T.V. lesson. He can, however, deviate from that sheet if he finds it necessary.

Television is being used for educational purposes in our country for the last about 30 years. First it was used in schools of Delhi in 1961. Later the scheme was taken up by Doordarshan Kendras of Mumbai, Chennai and Srinagar.

The first attempt to use T.V. on a mass scale was made by using an American Satellite (ATS-6) in 1975-76 during the Satellite Instructional Television experiment (SITE). The SITE was conducted for about one ear in rural areas scattered in twenty districts of six states namely Andhra Pradesh, Bihar, Karnataka, M.P, Odissa and Rajasthan. There was twenty minutes programme every day for the children during school hours. The Satellite was also used for 12 days in order to give orientation programme to primary school teachers in science.

In April 1982, India acquired its own national satellite (INSAT) and since then T.V. is being used on a mass scale for qualitative improvement of elementary education. Its services have been utilized in Andhra Pradesh, Odissa, Maharashtra, Gujarat, U.P, and Bihar. Since 1984, ETV programmes are being relayed by High Power transmitters (HPTS) and Low Power Transmitters (LPTS). Day by day, more and more efforts are being made to make educational TV reach all corners of the country.

Kinds of Educational T.V.:

1. **Open Circuit Television:**
   It is the usual type of telecast by commercial or non-commercial stations.
2. **Closed Circuit Television:**
   It is the selective telecast which can be tuned in only by specially equipped receivers.

Types of Educational Programmes

The following are the types of education programmes commonly used on T.V.

(i) **Demonstration Type:**

It can be commercial as well as educational. Some outstanding class room activity of a school is made known to others through television.

(ii) **Supplementary Type**:

In some subjects, there are few problem areas. The supplementary type of programmes assists the schools in supplementing their knowledge in those specific areas. This is also called enrichment programme.

(iii) **Direct Teaching programmes:**

This type of programmes is telecast for direct teaching in the different type of schools. They are used in elementary schools, high schools and adult schools. It has been done in a few selected cities only.

Advantages:

1. With the help of television, a large number of students can be given information at a time.
2. Television helps in improving the pronunciation of the students. Listening, speaking and understanding abilities of the learners can be improved.
3. On the television, mode type of hand writing can be drawn. The students may look at it and they can improve their own writing.
4. The students with slow speed of writing may be asked to listen to the news and then they may write it down in their note-books. Thus their speed of writing can be improved.
5. The gifted children can be benefited because they can do some work of advance nature which is usually not available to them in their class rooms.
6. With the help of television, the ablest and the most capable teachers are brought to the T.V. screen. Thus teaching improves considerably in the classrooms.
7. The use of different types of or T.V aids by the teachers in their class rooms in expensive. On the T.V. such lessons involving the use of many aids may be telecast. It will reduce the expenditure on teaching.
8. Television is a time saving device. More of syllabus may covered in less time because everything on the lesson will be carefully planned without any sort of deviations.
9. The students who are not able to attend the class due to some reason can watch the T.V. lesson at their homes.
10. From the television, the students will be able to have uniform type of information. No student can grudge that he/she could not listen properly because of back benches.

11. With the help of television, the students can see many things places, situations etc. which otherwise they may not be able to see due to various reasons.
12. It helps in reducing the load of work of the teacher. When the T.V. lesson is on, the teacher is in the background and he helps the students on the points where his help is sought by them.
13. On the television, lessons of the expert teachers are telecast. Surely it improves the knowledge of the teachers and also helps them to become better teacher.

Limitations

1. It is one way communication. The students cannot put any question nor can they seek any clarification when the T.V. lesson is going on.
2. Individual differences of the learners are not attended to in a T.V. lesson.
3. The time for the T.V. lesson may not suit the teacher or the school. It may cause lot of inconvenience to many persons.
4. It may not be learner-centered approach as mostly the students have to remain passive listeners.
5. A television set is expensive and every school may not be able to have it for teaching purpose.
6. The whole T.V. programme is rigid. Everyone has to watch it. The principle of flexibility is not cared for.

Television is certainly a better and more effective aid as compared to radio because it can present action along with the voice of the speaker. It makes the experiences concrete, real and immediate. On the whole, it helps considerably in making the teaching-learning process more concrete and sound.

Experience of the world shows a good deal of advantages of radio and T.V. in education. The more the children use their senses the greater is the learning on their part.

7.7.10 Newspapers:

Newspapers are mostly used for communication purposes in our country. News of different types passes on to the people with the help of newspapers. The unemployed people see vacancies under the column ‘vacancies’ or ‘situation vacant’. The student’s community sees the results of different examinations from the newspapers. Big business centers send their advertisements and attract customers through newspapers. Besides, some newspapers carry news concerning income tax, court notices. Sunday magazines are there to cater to the needs of the literary persons. Very rarely, a newspaper is used to serve some useful educational purposes in the formal educational system.

Types of Newspaper

Everybody is acquainted with daily newspapers such as the Tribune, Punjab Kesri, Hindustan Times etc. There are other newspapers also bi-weekly, fortnightly monthly, quarterly etc. they are put to use differently in different schools. In some schools, one teacher or one student reads out the main news in the morning assembly. In some schools, in each class room, they have some discussions on news. A large number of schools have a chalk board named 'News' and same teacher or students write the news on that board sp that all the students of the school may read these news.

Making formal education more interesting need a different use of newspaper for class room teaching purposes. Some newspapers based on education only be published and made available for the student community. This type of newspaper should contain educational items only which may be used by the students, community for teaching the desired goals of communication. There may be columns concerning primary education vocational, education, teacher training, general knowledge competitive exams, etc. It will benefit all type of students who ever aspire for better careers.

Educational value of Newspapers

Newspapers have great educational value which is briefly given below:

- They are a very good source of knowledge. Any and every type of knowledge can be gained out of them. A man of science, arts or technology finds useful knowledge in them.
- They help the students in supplementing the knowledge they get from the text books.
- They impart information about the cultural heritage. On the day of religious festivals such as Diwali, Dussehra, Holi, Baisakhi, the newspapers contain lot of information on these aspects. All this adds to the knowledge of the students.
- The newspapers keep the students busy during their free time. Thus they are able to utilize their leisure time fruitfully.
- They develop the skill of reading. Reading newspapers in the library makes them library minded. Many students are able to do extensive reading which helps them in their future careers.
- They develop in the students love for literature. Material literary type such as stories, poems, pieces of literary taste are presented in the newspapers on week-ends.
- The newspapers also contain material which has a good deal of recreational value. Tit-bits, jokes, cartoons, etc. recreate the students.
- They give the students information of national interest. Even in international understanding the students are benefitted.

- The newspapers motivate the students in preparing better for the different competitions.
- Newspapers also help the students in preparing better for the different competitions.

Thus we find that newspapers can work wonders in developing the careers of the students. There is need of reading the newspapers for different purposes.

Thus we find that the different types of aids have their marked value in the teaching learning process. This does not mean that the use of one aid or the other is a passport to the success of a lesson. In fact, the success or failure of a lesson depends upon many factors. A bad teacher having a variety of aids cannot come out to be an excellent teacher. On the other hand, a teacher without the assistance of some aids can comes out to be a good teacher. If the aids are to be used at all, the teacher should see that they are used at the right moments and in the right ways.

Should audio visual aids be used by all types of teachers? No, every teacher may not use them. A beginner teacher must use them. A teacher under training is expected to use them. Gradually every teacher should go on decreasing his/her dependence upon different types of aid. Undoubtedly, the variety of audio visual aids makes the teaching process reasonably good and effective. In this regard Comenius rightly says, "The foundation of all learning consists in representing clearly to the senses, sensible objects so that they can be appreciated easily."

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. Define projected aids?

…………………………………………………………………………

……………………..…………………………………………..…………

2. Explain the types of instructional aids.

…………………………………………………………………………

………………………………………………………….……………………

7.8 LET US SUM UP

In this unit you have learnt Multimedia meaning, nature, and scope of multimedia, approaches of multimedia and types of instructional aids.

7.9 UNIT-END EXERCISES

1. Describe the different types of non projected Aids?

2. Describe multimedia approach.

7.10 ANSWER TO CHECK YOUR PROGRESS

1. The different types of non-projected aid are detailed here below:

(i) **Graphics**: Graphics are related to writing, drawing, painting etc. they are vividly descriptive. For example, maps, diagrams, graphs, atlas, charts tec.
(ii) Three dimensional aids are models, globe, specimens etc.
(iii) **Display Board:** Any type of board on which something can be displayed and the students may consult and be benefited. For example, pocket Board, Flannel Board, Bulletin Board, Magnet Board, Fixo Graph Board., etc.
(iv) **Audio Aids:** those aids which can be heard. For example, Tape Recorder, Record Player etc.
(v) **Charts**: A chart is another software aid used quite frequently in the instructional process. It is defined as "a visual symbol summarizing or comparing or contrasting or performing other helpful services in planning subject maker." A chart is commonly used aid very 'popular with teachers under training though actual class room teachers use it rarely.

2. **Procedure for Adopting Multimedia Approach**

Multimedia approach calls for the use of more than one media in the teaching - learning process. It is imperative that a judicious mix of the several possible media available needs to be done. The following figure shows the 6 steps to be followed while adopting the Multimedia approach.

First stage: In this stage the teacher initiate the teaching – learning activities. He sets the ball rolling by delivering a well prepared lesson based on the objectives formulated. He could use a variety of media for his presentation.
Second stage: In this stage, the teacher demonstrates a specific and specialized unit using a mix of media. The teacher may provide learner with programmed learning materials, cassettes, CD's etc.
Third stage: this is a preparatory stage for the learner before he starts independent learning. The student discusses with peer students and teachers his plans of action
Fourth Stage: In this stage the learner actively participates. He uses a variety of media and materials in his self-study.
Fifth Stage: In this stage the learner integrates theory with practice.
Sixth Stage: In this stage learner finds that teaching – learning activities have to be organized on a higher level. He is involved in critical analysis, critical evaluation and exchange of ideas.

7.11 SUGGESTED READINGS

1. Clark, R. E. (1994). Media will never influence learning. *Educ. Technol.*
2. Guzley, R.M., Avanzino, S. and Bor, A. (2001) ‘Simulated computer-mediated/videointeractive distance learning: a test of motivation, interaction satisfaction, delivery, learning and perceived effectiveness.
3. Mayer, R. E. (in press). *Multimedia Learning*, Cambridge University Press, New York.
4. Rieber, L. P. (1990). Animation in computer-based instruction. *Educ. Technol. Res. Dev.* 38: 77–86.
5. Salomon, G. (1979/1994). *Interaction of Media, Cognition, and Learning*, Erlbaum, Hillsdale, NJ.

UNIT-8 Recent Trends in Multimedia

Structure

8.1 INTRODUCTION

The knowledge of various media is of great help to a teacher while transacting learning experience. In this unit, we focus on why and how various media are using in education and recent trends in multimedia and implication of multimedia in teaching learning process.

8.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the meaning of multimedia
- Appropriate use of multimedia in education
- Discuss the advantages and limitations of multimedia
- Enlist the recent trends in multimedia
- Know the implication of multimedia in teaching learning

8.3 Advantages, Limitations and Challenges of using Multimedia in Education

Multimedia is content that uses a combination of different content forms such as text, audio, images, animations, video and interactive content. Multimedia contrasts with media that use only rudimentary computer displays such as text-only or traditional forms of printed or hand-produced material.

Multimedia can be recorded and played, displayed, interacted with or accessed by information content processing devices, such as computerized and electronic devices, but can also be part of a live performance. Multimedia devices are electronic media devices used to store and experience multimedia content. Multimedia is distinguished from mixed media in fine art; for example, by

including audio it has a broader scope. In the early years of multimedia the term "rich media" was synonymous with interactive multimedia, and "hypermedia" was an application of multimedia.

In the intervening forty years, the word has taken on different meanings. In the late 1970s, the term referred to presentations consisting of multi-projector slide shows timed to an audio track. However, by the 1990s 'multimedia' took on its current meaning.

In the 1993 first edition of Multimedia: Making It Work, Tay Vaughan declared "Multimedia is any combination of text, graphic art, sound, animation, and video that is delivered by computer. When you allow the user the viewer of the project to control what and when these elements are delivered, it is interactive multimedia. When you provide a structure of linked elements through which the user can navigate, interactive multimedia becomes hypermedia."

The German language society Gesellschaft fur deutsche Sprache recognized the word's significance and iniquitousness in the 1990s by awarding it the title of German 'Word of the Year' in 1995. The institute summed up its rationale by stating "[Multimedia] has become a central word in the wonderful new media world".

In common usage, multimedia refers to an electronically delivered combination of media including video, still images, audio, and text in such a way that can be accessed interactively. Much of the content on the web today falls within this definition as understood by millions. Some computers which were marketed in the 1990s were called "multimedia" computers because they incorporated a CD-ROM drive, which allowed for the delivery of several hundred megabytes of video, picture, and audio data. That era saw also a boost in the production of educational multimedia CD-ROMs.

The term "video", if not used exclusively to describe motion photography, is ambiguous in multimedia terminology. Video is often used to describe the file format, delivery format, or presentation format instead of "footage" which is used to distinguish motion photography from "animation" of rendered motion imagery. Multiple forms of information content are often not considered modern forms of presentation such as audio or video. Likewise, single forms of information content with single methods of information processing (e.g. non-interactive audio) are often called multimedia, perhaps to distinguish static media from active media. In the fine arts, for example, Leda Luss Luyken's ModulArt brings two key elements of musical composition and film into the world of painting: variation of a theme and movement of and within a picture, making ModulArt an interactive multimedia form of art. Performing arts may also be considered multimedia considering that performers and props are multiple forms of both content and media.

CATEGORIZATION

Multimedia may be broadly divided into linear and non-linear categories:

- Linear active content progresses often without any navigational control for the viewer such as a cinema presentation;
- Non-linear uses interactivity to control progress as with a video game or self-paced computer-based training. Hypermedia is an example of non-linear content.

Multimedia presentations can be live or recorded:

- A recorded presentation may allow interactivity via a navigation system;
- A live multimedia presentation may allow interactivity via an interaction with the presenter or performer.

ADVANTAGES OF MULTIMEDIA

Basically Multimedia helps you explain your message to your audience in an interactive way. Your content is no more a boring read. It includes pictures, videos, info graphics, explainers, timelines, tweet embeds and so on. It provides your audience with additional information, one that your blog post is possibly not touching upon.

1. Increased learning effectiveness
2. Gains and holds attention
3. More appealing
4. Reduces training cost
5. Easy to use
6. Give information cost
7. Provides high quality of presentations
8. Multi-sensorial
9. Integrated and interactive
10. Can be used as a wide variety of audience

It covers many visual arts. From mobile phones to blockbuster movies. It covers a vast range. From an artist's point of view you can be an animator on website. Game's concept art and animation. Storyboards for film and animation as well as comics. It also covers coding for apps, websites and software. Film and a variety of subject are in-between. Some actor's started out in multi-media too.

Multimedia is a combination of text, graphics, sound, animation, and video, interactive electronic or digital means of manipulation delivered to the user. Multimedia elements, including text, video, sound, graphics and animation.

- This is a very user-friendly. It does not need the number of energy users, in this sense, you can sit down to watch the demo, and you can read the text and hear the sound.
- It is a multi-sensory. It uses the senses of many users, while the use of multimedia, such as hearings, sees and talk.
- It is a comprehensive and interactive. Through different media in the process of digital integration. The possibility of interaction easy feedback is greatly increased.
- It is flexible. Digitalization, this media can easily be changed to adapt to different situations and audiences.
- It can be used for a variety of audiences, ranging from one person to the whole group.
- One can communicate with people in remote locations just like all sitting in a single drawing room.
- Multimedia applications allow the computer user to communicate with the computer system in a variety of ways (speaking, writing, moving objects etc.).
- Multimedia applications give a real world impression while using a computer.

- You do not need to convert data into computer acceptable form. Data is acceptable in the form of voice, moving pictures, and images etc.
- Naturally people get attraction toward computer learning.
- Usage of computer products increases in business environments.
- Students and trainees find it easy to understand what is being taught to them.
- Disable persons can also use computer systems.
- Computer system can be connected to other machines and electronic devices.

LIMITATIONS OF MULTIMEDIA

This is particularly true if students work in groups to view multimedia sources or share computers. Additionally, students who are not as proficient with technology may have to spend more time learning computer skills to access information than focusing on course materials.

Accessibility

Multimedia requires electricity to be operated, which may not be available in some rural areas or may not be consistently available due to shortages and blackouts.

Distracting

Multimedia may take away the focus from the lesson due to its attention-grabbing formats.

Costly

Production of multimedia is more expensive than others because it is made up of more than one medium. Production of multimedia requires an electronic device, which may be relatively expensive. Multimedia requires electricity to run, which adds to the cost of its use.

Time Consuming

Creating multimedia requires more time.

Requires Mastery

Multimedia requires consistent and long practice to master, which may take a lot of time and energy from the user.

Limited Support/Compatibility

There is a wide variety of gadget models which arouses incompatibilities of media formats.

Fragile

The device used for multimedia must be used with care; exposure to moisture or other elements could cause expensive, irreparable damage which would require another purchase of a device.

CHALLENGES OF USING MULTIMEDIA IN EDUCATION

Multimedia finds its application in various areas including, but not limited to, advertisements, art, education, entertainment, engineering, medicine, mathemat ics, business, scientific research and spatial temporal applications. Several examples are as follows:

Creative industries

Creative industries use multimedia for a variety of purposes ranging from fine arts, to entertainment, to commercial art, to journalism, to media and software services provided for any of the industries listed below. An individual multimedia designer may cover the spectrum throughout their career. Request for their skills range from technical, to analytical, to creative.

Commercial uses

Much of the electronic old and new media used by commercial artists and graphic designers is multimedia. Exciting presentations are used to grab and keep attention in advertising. Business to business and interoffice communications are often developed by creative services firms for advanced multimedia presentations beyond simple slide shows to sell ideas or liven up training. Commercial multimedia developers may be hired to design for governmental services and nonprofit services applications as well.

Entertainment and fine arts

Multimedia is heavily used in the entertainment industry, especially to develop special effects in movies and animations (VFX, 3D animation, etc.). Multimedia games are a popular pastime and are software programs available either as CD-ROMs or online. Some video games also use multimedia features. Multimedia applications that allow users to actively participate instead of just sitting by as passive recipients of information are called *interactive multimedia*. In the arts there are multimedia artists, whose minds are able to blend techniques using different media that in some way incorporates interaction with the viewer. One of the most relevant could be Peter Greenaway who is melding cinema with opera and all sorts of digital media. Another approach entails the creation of multimedia that can be displayed in a traditional fine arts arena, such as an art gallery. Although multimedia display material may be volatile, the survivability of the content is as strong as any traditional media. Digital recording material may be just as durable and infinitely reproducible with perfect copies every time.

Education

In education, multimedia is used to produce computer-based training courses (popularly called CBTs) and reference books like encyclopedia and almanacs. A CBT lets the user go through a series of presentations, text about a particular topic, and associated illustrations in various information formats. Edutainment is the combination of education with entertainment, especially multimedia entertainment.

Learning theory in the past decade has expanded dramatically because of the introduction of multimedia. Several lines of research have evolved, e.g. cognitive load and multimedia learning.

From multimedia learning (MML) theory, David Roberts has developed a large group lecture practice using PowerPoint and based on the use of full-slide images in conjunction with a reduction of visible text (all text can be placed in the notes view' section of PowerPoint). The method has been applied and evaluated in 9 disciplines. In each experiment, students' engagement and active learning has been approximately 66% greater, than with the same material being delivered using bullet points, text and speech, corroborating a range of theories presented by multimedia learning scholars like Sweller and Mayer. The idea of media convergence is also becoming a major factor in education, particularly higher education. Defined as separate technologies such as voice (and telephony features), data (and productivity applications) and video that now share resources and interact with each other, media convergence is rapidly changing the curriculum in universities all over the world.

Educational technology

Multimedia provides students with an alternate means of acquiring knowledge designed to enhance teaching and learning through various mediums and platforms. This technology allows students to learn at their own pace and gives teachers the ability to observe the individual needs of each student. The capacity for multimedia to be used in multi-disciplinary settings is structured around the idea of creating a hands-on learning environment through the use of technology. Lessons can be tailored to the subject matter as well as be personalized to the students' varying levels of knowledge on the topic. Learning content can be managed through activities that utilize and take advantage of multimedia platforms. This kind of learning encourages interactive communication between students and teachers and opens feedback channels, introducing an active learning process especially with the prevalence of new media and social media. Technology has impacted multimedia as it is largely associated with the use of computers or other electronic devices and digital media due to its capabilities concerning research, communication, problem-solving through simulations and feedback opportunities.

Social work

Multimedia is a robust education and research methodology within the social work context. The five different multimedia which supports the education process are narrative media, interactive media, communicative media, adaptive media, and productive media. Contrary to long-standing belief, multimedia technology in social work education existed before the prevalence of the internet. It takes the form of images, audio, and video into the curriculum.

First introduced to social work education by Seabury & Maple in 1993, multimedia technology is utilized to teach social work practice skills including interviewing, crisis intervention, and group work. In comparison with conventional teaching method, including face-to-face courses, multimedia education shortens transportation time, increases knowledge and confidence in a richer and more authentic context for learning, generates interaction between online users, and enhances understanding of conceptual materials for novice students.

In an attempt to examine the impact of multimedia technology on students' study, A. Elizabeth Cauble & Linda P. Thurston conducted a research in which Building Family Foundations (BFF), an interactive multimedia training platform, was utilized to assess social work students' reactions to multimedia

technology on variables of knowledge, attitudes, and self-efficacy. The results state that respondents show a substantial increase in academic knowledge, confidence, and attitude. Multimedia also benefits students because it brings expert to students online, fits students' schedule, allow students to choose courses that suit them.

Mayer's Cognitive Theory of Multimedia Learning suggests, "People learn more from words and pictures than from words alone." According to Mayer and other scholars, multimedia technology stimulates people's brains by implementing visual and auditory effects, and thereby assists online users to learn efficiently. Researchers suggest that when users establish dual channels while learning, they tend to understand and memorize better. Mixed literature of this theory are still present in the field of multimedia and social work.

Language communication

With the spread and development of the English language around the world, it has become an important way of communicating between different people and cultures. Multimedia Technology creates a platform where language can be taught. The traditional form of teaching English as a Second Language (ESL) in classrooms have drastically changed with the prevalence of technology, making easier for students to obtain language learning skills. Multimedia motivates students to learn more languages through audio, visual and animation support. It also helps create English contexts since an important aspect of learning a language is developing their grammar, vocabulary and knowledge of pragmatics and genres. In addition, cultural connections in terms of forms, contexts, meanings and ideologies have to be constructed. By improving thought patterns, multimedia develops students' communicative competence by improving their capacity to understand the language. One of the studies, carried out by Izquierdo, Simard and Pulido, presented the correlation between "Multimedia Instruction (MI) and learners' second language (L2)" and its effects on learning behavior. Their findings based on Gardner's theory of the "socio-educational model of learner motivation and attitudes", the study shows that there is easier access to language learning materials as well as increased motivation with MI along with the use of Computer-Assisted Language Learning.

Journalism

Newspaper companies all over are trying to embrace the new phenomenon by implementing its practices in their work. While some have been slow to come around, other major newspapers like *The New York Times*, *USA Today* and *The Washington Post* are setting the precedent for the positioning of the newspaper industry in a globalized world.

News reporting is not limited to traditional media outlets. Freelance journalists can make use of different new media to produce multimedia pieces for their news stories. It engages global audiences and tells stories with technology, which develops new communication techniques for both media producers and consumers. The Common Language Project, later renamed to The Seattle Globalist, is an example of this type of multimedia journalism production.

Multimedia reporters who are mobile (usually driving around a community with cameras, audio and video recorders, and laptop computers) are often referred to as mojos, from mobile journalist.

Engineering

Software engineers may use multimedia in computer simulations for anything from entertainment to training such as military or industrial training. Multimedia for software interfaces are often done as collaboration between creative professionals and software engineers.

Mathematical and scientific research

In mathematical and scientific research, multimedia is mainly used for modeling and simulation. For example, a scientist can look at a molecular model of a particular substance and manipulate it to arrive at a new substance.

Medicine

In medicine, doctors can get trained by looking at a virtual surgery or they can simulate how the human body is affected by diseases spread by viruses and bacteria and then develop techniques to prevent it. Multimedia applications such as virtual surgeries also help doctors to get practical training.

8.4 Recent Trends in Multimedia

Some of the current trends include the following:

Web 2.0 tools and applications Digital Spherical Displays Digital Spokesperson (live actor)

Web 2.0:

Web 2.0 Web 2.0 is a new term that describes a new form of technological communication that gives educators, business professionals or students "the ability to collaborate and share information online." (WebMediaBrands Inc., 2009)

Information about Web 2.0 :

Information about Web 2.0 Web 2.0 consists of the following tools: Podcasts Blogs RSS feeders Social Networking Wikis "Web 2.0 tools focuses on knowledge sharing and creation." (Huang, last modified 2007)

Benefits of Web 2.0 :

Benefits of Web 2.0 Encourages participation and collaboration amongst educators, students and business professionals. Available anytime on line, anywhere from any location, inexpensive and affordable for anyone. Instant feedback on projects, reports or research papers. Sites are easy to design, manage and update. Opportunities for real time conversations, videoconferencing or messaging without having to download Instant Messaging (IM) software or constantly use "traditional" email.

Digital Spherical Displays :

Digital Spherical Displays Provides a 360 degree multimedia display Can be incorporated in many markets or territories Can be used in educational installations, exhibitions, displays, events, parties or set designs Popular Company: Pufferfish

Pufferfish Puffersphere :

Pufferfish Puffersphere Multimedia Company that develops and markets AV products such as the Puffersphere Specialize in 360 degree spherical display systems Link to website: http://www.pufferfishdisplays.co.uk/

Digital Spokesperson (live actor) :

Digital Spokesperson (live actor) Aids in bringing a website to life Adds a personal touch to a website Script can be tailored to fit the needs of your site Spokesperson can be used to market various sites or even conduct on line tutorials.

8.5 IMPLICATIONS OF MULTIMEDIA IN TEACHING LEARNING

Adoption of multimedia approach to teaching-learning required drastic changes in the organizational and administrative set up of our educational system.

I. There is a need of sound infrastructure and needed facilities for the adoption of multimedia approach like

- Black board, bulletin board and other display board.
- Hall and dark room facilities for showing films and using slides and other projective aid materials.
- Library and reading room facilities.
- Laboratory, workshop and other essential facilities for useful practical experiences.
- Audio-visual library containing useful software material and hardware equipment like picture, chart ,maps, globes, specimen models, slides, films, audio and video, cassettes audio and recording instruments, projectors, teaching machines, program learning text materials and packages, computer and computer aided instructional material …etc.
- Facilities and provisions for production repair and maintenance of the audiovisual aid material and equipments.
- The availability of trained and interested teachers for making use of the material and media in the best possible way.

II. There will arise a need of bringing necessary dynamicity and flexibility in the existing school time table and programmes. Normal school programmes and time table do not cater to the needs and requirements of

multimedia approach. The adoption of multimedia need relevant changes in the present organizational set up of our schools.

III. It will necessitate the setting up of proper agencies of coordinating the efforts of mass media for providing useful learning experiences to school children distance education learners.

IV. There will arise a need of providing training to the teachers for making proper use of multimedia approach. It will give relevant improvements in the curriculum of teachers training at various levels.

V. Lastly but not the least there is an overall need of brining changes in the attitude of teachers and also of the learners for the successful adoption of multimedia approach. The media need to be utilized in such a cooperative way as to encourage active particiapation and involvement of the learners in realization of the set objectives.

IMPLICATION OF MULTIMEDIA IN LEARNING TEACHING

Thus, using images, video and animations alongside a text stimulates the brain. Student attention and retention increase. Under these circumstances, in a multimedia learning environment, students can identify and solve problems more easily compared to the scenario where teaching is made possible only by textbooks.

While there is no doubt that the interest in technology education is rising, the fast progression in the past years has been impressive. Investments as well as the school spending are on the rise.
One might wonder why. This is the reason why we are going to explore five of the benefits multimedia learning brings to the 21st century classroom, which could be contributing to the recent detect boom.



1. Deeper understanding

According to research, a benefit of multimedia learning is that it takes advantage of the brain's ability to make connections between verbal and visual representations of content, leading to a deeper understanding, which in turn supports the transfer of learning to other situations. All of this is important in today’s 21st century classrooms, as we are preparing students for a future where higher-level thinking; problem solving and collaborative skills will be required.

2. Improved problem solving



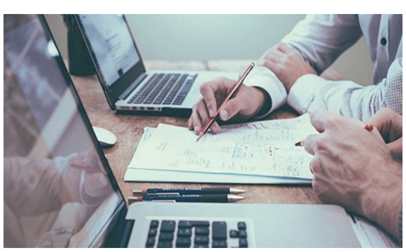
A large percentage of the human brain dedicates itself to visual processing. Thus, using images, video and animations alongside a text stimulates the brain. Student attention and retention increase. Under these circumstances, in a multimedia learning environment, students can identify and solve problems more easily compared to the scenario where teaching is made possible only by textbooks.

3. Increased positive emotions



According to psychologist Barbara Fredrickson, experiencing positive emotions makes people see more possibilities in their lives. Using multimedia during instructions impacts student's mood during the learning process. With a positive attitude they learn better and tend to be more proactive.

4. Access to a vast variety of information



With computers, tablets, smart phones and the internet, students are today better equipped than ever to search and find the information they need. A study revealed that 95% of students, who have access to internet, use it to search for online information. Sharing the information and participating in class discussions is done in a more confident way when access to information is as easy as today.

5. World exploration



There is no surprise here. With the help of multimedia children can explore and learn about places they would never been to. In a geography class, students can explore different cities of the world, the tallest mountains and the most dangerous jungles. In a science class, space and planets exploration is now possible. In a biology class, the dissection of rare animals and different habitats exploration are like a walk in a park for students benefiting of a multimedia learning environment.

All together, multimedia learning environments have a direct effect on learning and even on growing as a person. An effect that differs and can't be achieved as easy whilst using traditional education materials. Therefore, it is no wonder the detach business is increasing and schools desire more and more to create multimedia learning environments for their students.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. What are the uses of multimedia in Education?

…………………………………………………………………………

……………………..………………………………………..…………

2. Describe the implication of multimedia in teaching and learning.

…………………………………………………………………………

……………………………………………………….…………………

8.6 LET US SUM UP

In this unit you have learnt recent trends in multimedia, Advantages of multimedia, Limitations and challenges of using multimedia in education and implication of multimedia in teaching and learning.

8.7 UNIT-END EXERCISES

1. What are the limitations of Multimedia?
2. Explain the recent trends in Multimedia.

8.8 ANSWER TO CHECK YOUR PROGRESS

1. Limitations of multimedia
    - Accessibility
    - Distracting
    - Costly
    - Time Consuming
    - Requires Mastery
    - Limited Support/Compatibility
    - Fragile
2. Recent trends in multimedia

- Web 2.0 :
- Information about Web 2.0 :
- Benefits of Web 2.0 :
- Digital Spherical Displays
- Pufferfish Puffer sphere
- Digital Spokesperson (live actor)

8.9 SUGGESTED READINGS

1. Mayer, R. E., and Anderson, R. B. (1991). Animations need narrations: An experimental test of a dual-coding hypothesis. *J. Educ.*
2. Moreno, R., and Mayer, R. E. (1999a). Cognitive principles of multimedia learning: The role of modality and contiguity. *J. Educ. Psychol.* 91: 358–368.
3. Pailliotet, A. W., and Mosenthal, P. B. (eds.). (2000). *Reconceptualizing Literacy in the Age of Media, Multimedia, and Hypermedia*, JAI/Ablex, Norwood, NJ.
4. Harasim, L., Hiltz, S., Teles, L. and Turoff, M. (1995) Learning Networks: A Field Guide to Teaching and Learning Online, Cambridge, MA: MIT Press.
5. Hülsmann, T. (2000) The Costs of Open Learning: A Handbook, Oldenburg: Bibliotheks- und Informationssytem der Universität Oldenburg.

UNIT-9 ENHANCING TECHNOLOGY FRIENDLY PRACTICES AMONG TEACHERS

Structure

9.1 INTRODUCTION

In this unit discuss about the technology friendly practices among teachers. Computer is an electronic device that solves problems by applying prescribed operations on data entered into it. Functions or computers in different areas can be categorized as control, communication, simulation, designing and artificial intelligence. Teaching –learning process is at the heart of any educational system and the process is basically a communication process. If function of a computer are harnessed to its full extent it can help a teacher in making the teaching-learning process more effective than with the used of any other media. For this, a lot of educational courseware for students is needed to be developed. Hence, in this unit you are going to learn the computer assisted instruction, computer managed instructions, cybernetics, E-learning and use of net search and websites that will help you in the teaching learning process.

9.2 OBJECTIVES

After going through this unit, you will be able to:

- Appropriate use of technology friendly practices among teachers
- Describe the computer assisted instruction
- Explain the computer managed instruction
- Discuss the use of Net search and Websites

9.3 ENHANCING TECHNOLOGY FRIENDLY PRACTICES AMONG TEACHERS

Introduction

Computer is the finest and most important gift of science and technology to the mankind. It has done miracles in almost all walks of life. Today, there is no aspects of our life that remain untouched by the use and application of computers. In the field of education too, these are being used for managing its affairs including the actual teaching. With the introduction of New Education Policy in1986, our country also has taken initiative for making their use in the teaching-learning activities. The instructional work so carried out with the help of computer is generally known as Computer-assisted Instruction (CAI). In this chapter, we will know something about such type of instructions.

9.4 COMPUTER ASSISTED INSTRUCTIONS

Meaning and Definition

Computer-assisted instruction (CAI), as the name suggests, stands for the type of instruction aided or carried out with the help of a computer as a machine. It is just one step ahead of the use of teaching machine and, probably, two of the use of programmed textbook in making the instructional process as self-directed and individualized as possible.

The computer is said to be ahead of the teaching machine on account of its capacity of doing more work and multiple types of works at the same time for an unlimited number of individual learners than the teaching machine. CAI instruction, for this reason, is relatively a new and developed concept than the teaching machine and programmed learning-oriented instructional technology. As observed by Hilgard and Bower (1977),"*Computer-assisted instruction has now taken as so many dimensions that it can no longer be considered as a simple derivative of the teaching machine or the kind of programmed learning that Skinner introduced*".

In this way, the fact stands quite clear before us. The use of computer has now almost revolutionized the field of instruction in all its dimensions. It can't be defined now as a teaching device for presenting programmed instructional material and, consequently, it will not be proper to define CAI as the type of instruction which makes use of computers.

Let us examine one more definition of CAI by Bhatt and Sharma (1992). They state that *"CAI is an interaction between a students, a computer controlled display and a response entry device for the purpose of achieving educational outcomes."* This definition brings into limelight the following things:

- In CAI there is an interaction between an individual student and the computer just as happens in the tutorial system between the teacher and an individual student.
- The computer is able to display the instructional material to the individual student.
- The individual student takes benefit of the displayed material and responds to it. These responses are attended by the computer for deciding the future course of instruction displayed to the learner.
- The interaction between the individual learner and the computer device helps in the realization of the set instruction objectives.

However, the above definition is somehow lacking in respect of giving the basic essentials about the nature and characteristics of the instruction provided by CAI. For doing away with such weakness, it can be modified in the following way: Computer-assisted instruction is a method of instruction in which there is a purposeful interaction between a learner and the computer device(having useful instructional material as software) for helping the individual learner achieve the desired instructional objectives with his own pace and abilities at his command.

Basic Assumptions

The computer-assisted instruction, meant for auto-individualized instructions, rests on the following basic assumptions:

1. Instruction for a number of learners at a time

CAI can serve at a time thousands of learners in an individualized way. What an individual needs according to his ability and interest in a particular subject or topic, and accordingly he can get the instructional material and help from the computer. Moreover, it is the best programmed instruction available to him in such a nice individualized way. Hence, the first assumption of CAI lies in its capacity of providing quality and quantity auto-instruction to a sufficiently large number of the individual learners at a time.

2. Automatic recording of the learners' performance

How does an individual learner react to the presented instructional material? What are his quarries and difficulties? What is his performance in terms of learning outcomes? All such things can be successfully and accurately recorded by the computer device. It helps much in further planning the needed instruction to the individual learner for this proper advancement. This timely and proper auto-recording is the second assumption underlying CAI.

3. Variety in the use of methods and techniques

CAI assumes that every learner cannot be benefited through a single method and all the subjects or topics in a subject cannot be handled through a common method or strategies. It believes that there should be a wide variety of methods and approaches for imparting instruction in a particular subject or topic so that all the individual learners may be able to

choose a particular method or approach according to their own interest, ability and nature of the instructional material.

Technologies of CAI

Computer assisted instruction requires a joint effort of various persons in the matter of wise handling of men and material resources. Generally, it involves three types of technologies, namely hardware, software and courseware.

1. **Hardware**

The computer as a machine represents the hardware. In CAI, we certainly need an appropriate computer to suit our teaching-learning situation. It will require the services of an expert or technician for its maintenance and an operator (a teacher, a student or assistant may do the job with some training). The teacher himself must have a workable knowledge of the construction and working of a simple computer.

2. **Software**

The computer cannot do anything for imparting instruction to the learners if it is not fed with the software. The programmes-containing instructions to the computer in a language that it can understand are called software. These programmes are developed by the experts called programmers. The software used in CAI is of two kinds: (i) application software, and (ii) system software. The application software includes instructions to the computer for carrying out a total function required by the user. The user's concern is with this software. However, the system software is needed for organizing the resources of the computer to carry out the application tasks mentioned in the application programme. Its activities are: (i) to interpret the application programme in the code of the computer machine, (ii) to handle the input and output devices, and (iii) to schedule the work within the computer machine. Therefore, in a way, this software helps in the working of the computer or enabling it to do what is needed by the user in terms of its application.

3. **Courseware**

The courseware technology is the base of the instruction that is imparted to the learner by CAI. For example, a student of IX class wishes to learn about the topic "Elements, Compounds and Mixtures" in Chemistry. For this purpose, the computer machine as a hardware will need the services of software-the application and system programmes for its operation. These programmes will be prepared by the software programmer, an expert in the software technology. But for its preparation, he will certainly require the services of those who are experts in courseware technology who include: (i) experts, in the subject, (ii) in the methodology and strategies of teaching the subject, (iii) in instructional psychology, and (iv) In audio-visual aid preparation and use. What the courseware technology will prepare in terms of the instructional material and method of instruction, etc. will be translated by the software

technologists into software programmes for being used in the computer machine.

In this way, these three technologies and the persons operating them are jointly responsible for the preparation of the instructional activities conducted in CAI.

Types or Modes

Computer assisted instruction can take a variety of forms as detailed below for providing self-individualized instruction to a learner depending on the computer services availed.

1. **Informational instruction**

It helps the learner get the desired information he needs. Here the computer can serve the role of an enquiry officer, to respond to the student's enquiry with answers it has stored. It provides minimal interaction between the student and the computer programme. The sole purpose of this type of CAI is to provide essential information for the acquirement of concepts and skills. However, the individual learner can learn a lot by adopting an enquiry or discovery approach towards self-learning through such instruction.

2. **Drill and practice programmes**

CAI provides the learner with different types of drill and practice programmes covering specific topics related to a particular subject. Through these, the services of computers can be properly availed for providing practice in something already learned in some other way. It helps in the development of a variety of skills. For example, for providing practices in multiplication skill, the computer may display on the screen a simple problem like 7 X 8 = …….

The child is required to respond to typing the numeric keys of the keyboard. If the answer is wrong, the computer immediately displays WRONG and if the answer is correct, another problem for carrying out the practice is presented. These responses come within a fraction of a second; therefore, the child has not to wait for the answer for feedback. On the other hand, the computer has the required patience to wait and allow the child to go ahead with his own speed and intention of responding and move forward. The advanced programmes on drill and practice select the problems of varying difficulty levels on the basis of the student's performance during the earlier sessions. The computer is known to have a good memory for the errors of the learners and, therefore, proves a very effective teacher in providing the students proper material for their drill and practice.

3. **Tutorial type computer-assisted instruction**

In this type of CAI, the computers are engaged in actual teaching. Here they can play effectively the role of a tutor by maintaining a perfect interaction and dialogue with the individual students. The tutorial programmes are prepared not only to have instruction in topics such as Newton's laws of motion, sets and their operations, solar and lunar eclipses

but also to provide sufficient practice, having proper track of the student's difficulties and performance and move the students on the path of progress according to their own pace, abilities and requirements. If the student has been able to master a concept, the CAI programme provides the next step of instruction, but if he is not able to achieve mastery, the programme provides remedial instruction.

4. Educational games type

In it, the learners are provided with a variety of well-designed computer games. These games should not be confused with academic type games. Their purpose is only to provide intellectual challenge, stimulation of curiosity and serve as a source of motivation to the individual learner. In a course of learning, these games can be used as a source of review or as a reward for some accomplishment for the learner.

5. Simulation type of instruction

Simulation is used as a technique for providing training to the students. Such type of instructional activities provides powerful learning tools to them. With the carefully prepared programmes, the students are made to face real or idealized situations. They have to play an active role and are required to take decisions that have consequences. For example, a simulation computer programme may put the participants in the shooting range of the enemies in the battlefront or in the role of a hunter in a jungle full of horror or beasts or in the role of an explorer who is looking good a buried treasure. The stimulation in all these proves much less expensive and dangerous to have a trainee blow up something on the screen than to face a real danger to make a real mistake while trained in real situations.

6. Problems-solving type

This type of computer-assisted instruction focuses on the process of finding an answer to a problem rather than the answer itself. Here, the students are provided with programmes that can make them think about the ways and means of solving the problem systematically. With the concrete ways suggested in the programmes, the students can divide or analyze the problem into its small constituents and are able to devise systematic procedure for its solution. One of the best known problem solving instructional material packages is Logo, a procedure-oriented language based on the learning theories of Jean Piaget. Besides, there are other programmes available for different types of students for increasing the sophistication of their thought process helping them learn good thinking strategies and problem solving abilities.

7. Practical work-oriented instruction

CAI programmes can provide valuable help in supplementing laboratory and other practical work. A student can learn so many things about the science experiments before actually performing them in his practical class by watching and following a computer programme made for this purpose. Similarly, he can avail the necessary skills and experiences about practical tasks in other fields before actually engaging in such

practical activities. Thus, the children will have a necessary preparation and background from computers for their better performances at the school hours.

8. Learning affairs-managing type

In this type of instructional activities, the computer-assisted programmes provide valuable help in managing and supervising the learning affairs of the students. They can have a proper check over the learning activities of individual students by identifying their academic weaknesses through extensive diagnostic testing and to prescribe educational programmes to meet their individual needs. They can give assignments, help in self-study, library reading, and group work, take a test over assignment, keep progress chart and guide the teacher as well as parents to plan their children's education. In the subjects and areas needing extensive computation and manipulation of data, such as mathematics, engineering, statistics and advanced researches, the computers can do wonders. A mini computer can do and replace the work of a giant calculating machine. In the education of the handicapped children, e.g.deaf and dumb, the computers can provide the needed learning experiences with quite negligible efforts to the children. In this way, the computers can play a leading role not only in managing the affairs of the teaching-learning process but also in the whole range and areas connected with the world of education.

Limitations and Difficulties

The computer assisted instruction as we have seen is available in its various types for helping the students in their auto-instructional activities. Though perhaps, this is the most workable instructional device run by the individual learner with little or no teacher assistance. Yet, when coming to the practical use, it is found to suffer from a number of limitations and drawbacks:

1. The instruction of CAI in classrooms proves quite expensive and uneconomical in terms of educational returns.
2. Computer, as an electronic device, may invite significant hazards to children. There is a potential danger for the children either to damage the machine or be damaged by it.
3. Much of the difficulty is felt on account of the unavailability or usability of the educational software. Either we don't get any programme for a particular type of instruction and teaching of a topic or we are cheated by the computer firms by selling us the software found virtually useless and unusable.
4. Serving of the hardware (computer machine) also poses a serious problem. If for one or the other reason the machine is failed, the expertise to operate it again or do repair work is not easily available. Consequently, the regular instructional work on self-study of the students may receive a major setback.
5. The auto-instruction or self-study carried out in the form of CAI is basically a learners-controlled instruction. Here, the learner is the master of the whole instructional process and thus, there is little

scope for keeping restraint and checks on the learner. It may lead to indiscipline, truancy, carelessness and unnecessary wasting of time on the part of the students.

6. The learners are supposed to type from the keyboard or use light pens against the screen for putting up their responses. During long study hours, this exercise may prove quite boring, mechanical and tiresome. However, they have to live up with it as a way to interact with the computer on account of the fact that there is no computer till now that can communicate and respond to the speech and writing of the students like their teachers.
7. CAI, how good and effective it may prove as an instructional device, cannot be accommodated properly in the set-up of our schools or colleges comprising set time-table schedules, uniform curricula and groups-oriented instruction, and examination system. Neither we can replace or build up altogether a new structure nor can we dare to invite chaos by introducing CAI
8. The other major limitations of the CAI lie in the fact that computers are machines and no machine can ever match the human beings for effective interaction with the human beings. The emotional touch, warmth and sympathy as well as the heart link established in teacher-pupil interaction are not possible in CAI.

These limitations and drawbacks, however, do not undermine the importance of computers as an aid to instruction. They are not to replace the teacher or the traditional teaching-learning system, but to render a valuable help to the teacher as well as learners in their pursuit of excellence with regard to their responsibilities towards teaching and learning. Moreover, it is useless to say that the use of computers in classroom at once needs some advanced technical skills on the part of the teachers. In all practical sense, the computers may be handled like other hardware: T.V., video sets, camera and projectors. Even if one does not want to learn anything beyond how to load a programme (software) in the machine and run it, it is at his choice. Surely, it will not come in the way of a teacher to use computer as an instructional tool. He does not need to prepare the software (computer programme) as these programmes may be procured from the market or borrowed from some concerned educational agency. Therefore, there is a great need of making suitable environment by removing all type of hesitation and fear in the minds of the teachers for the adoption of CAI as a method or mode of instructions.

9.5 Computer Managed Instruction

Meaning and Definition

The tern computer managed instruction(CMI) simply stands for the instruction managed with the help of computer technology. It directly calls for the services and applications of computers in the field of instruction. However, in the language of computer technology, computer managed instructions may be defined as a category of computer programme that may be used by educators and instructors to organize and manage data related to

instruction for attaining the stipulated institutional objectives in a most effective way.

How are instructions managed by the computers?

As said in the above definition, computers are able to perform the task of managing instructions with the help of a category of suitable software programme specifically designed for this purpose. Some of the functions performed with the help of such developed software related to the organization and management of instructions are described no:

1. **Diagnosis of entry behaviour of the learners**

Computer programmes help in the early diagnosis of the strengths and weaknesses of the learners in terms of their previous knowledge and experiences related to a particular knowledge and skill area, their interests, attitudes and aptitudes, the needs and motives as well as other personality traits for determining their potentiality for going ahead in the learning of a particular instructional course or achieving a set of instructional objectives.

2. **Setting of instructional objectives**

Computer software are available that can help in analyzing test data (results of the diagnostic testing) and the other database (pooled) information about the characteristics of the learners in relation to the needs and purposes served by a particular served by a particular type of instruction at one or the other stages of school, college or public education. It will help in formulating the goals and objectives (educational as well as institutional) for a particular course or piece of instruction.

3. **Generating individualized instructional plans**

Depending upon the need, characteristics, nature and individuality of the learning, computer software are able to generate and organize individualized instructional plans for countless learners at one or the other times - average, gifted, slow or disabled.

4. **Generating instructional material and learning experiences**

Suiting to the individualized instructional plans and strategies computer software can generate appropriate instructional material and opportunities of interactive learning experiences to the learners of varying needs, interests and abilities. A huge data ban of all types of information and instructional material is easily available through well prepared software packages, websites, online conferencing, networking, etc.

The material generated and developed for instructional purposes may be used on a computer based system or in other forms of instruction, for example, programmed instruction, multimedia self-instruction, or group instruction including slides or tape presentations. Most of the so developed instructional material have been programmed in tutorial, drill and practice as well as stimulation and gaming modes and thus occupy significant advantages over the traditional instructional material available.

5. Availability of instructional material into curriculum units

For the proper organization and management of the instructions, an inventory of the instructional resources available to the learners may be stored in the computer's data bank. The total resources may be divided into properly required units having clearly specified set of objectives. There shall be clear directions available for telling the learners what to do for achieving the stipulated objectives. It may ask them to read a book, work off self-administered paper and pencil exercises, conduct experiment with a science kit, attend group instruction or see a film, and so on, it may also suggest the learners to take in the end a unit test after completing instructions or work prescribed for than unit. The computer after proper processing and satisfied with the progress of the learners, then may suggest him to proceed on to the next unit of the instruction.

6. Monitoring of progress

The computer managed instructions prove very effective in monitoring the progress of each and every individual learner in a quite satisfactory way. What one has done, is doing or will be doing in future can be properly monitored with the help of the great capacity of computers in keeping track of the countless learners in the progress of their instructional outputs. They are able to register the low achievement of the learners, detect the deficiencies in learning along with the possible causes and provide suggestions for overcoming the learning difficulties.

7. Providing remedial instructions

Computer software can very well manage any progress related to remedial instructions to the needy learners. On the basis of the learning difficulties diagnosed and the probable causes detected, these software now can suggest all the possible remedies helpful in the planning and organization of instruction. For example, if the student is feeling difficulty in the work related to a prescribed unit he may be helped in learning the necessary prerequisites for that unit so that he may no longer feel difficulty in learning that. However, if it is a motivational problem, a suggestion may be forwarded to him to review the goals or help him see the relationship between the present unit and the achievement of those goals.

8. Management of information and record keeping

Computer software may help in a big way for the collection, storage, classification and dissemination of information through a well-organized system of record keeping and its maintenance. Storage of information and record keeping are very much essential for the proper organization and management of instructions. The teachers and the learners may get a big help for their teaching and learning from the storehouses of such information data related to their respective field of teaching-learning. All types of information and data related to the interests, abilities, education and environmental backgrounds of the learners belonging to their past and present can be very well available for the students in their instructional outputs and overall welfare. Their educational progress can be very well monitored and maintained through the help of a well maintained

data record of all the individual learners which may prove quite helpful in maintaining an essential link between the classroom instructions and its administrative management.

9. Organization of testing and evaluation programmes

Computer software may provide valuable services in the task of managing and organizing testing and evaluation programmes related to classroom instructions and educational progress of the students in a variety of ways. They are helpful in assessing the study behaviour of the students for getting them admitted to a course of academic or professional study. Later on, day-to-day, periodic or end evaluation are all possible through the well-framed unit or course tests and other evaluation techniques available with the suitable software. Computer managed testing can set unit wise questions distributed over a category of objectives belonging to different domains of learners' behaviour from its pooled question bank by carefully selecting test items according to the difficulty level, discriminating index, the content covered, the objectives tested, etc. There is no problem of question leakage on the part of such testing. Moreover, a number of identical sets of question papers may be available for the proper administration and checking of malpractices during examination. The chances of grammatical mistakes, language and printing errors also are minimized with these testing programmes. Scoring and interpretation also are quite objective and mechanical leaving almost no chance of tradition human errors.

10. Generating all types of reports

Computer software help the processes and outputs of the instructional programmes by generating all progress and information reports related to the tasks of instruction. If you need the report related to the entry behaviour of the students, it is available on the computer's hard disk or files maintained for the purpose. You may have a printed copy of the same for planning the individualized instructions for your students. The data regarding the available instructional resources, aids and equipments, unit wise organization of the curriculum and the progress regarding the attainment of instructional objects are readily available to the learners and the teachers. The testing, evaluation and progress reports of the individual students and the group as a whole, generated through computers, can be sent to the parents for acquainting them with the progress of their children and seeking their help for their welfare. Such reports can also be used for the removal of their learning difficulties or deficiencies and for nurturing their talents and creativity.

In this ways, computer software and their applications may be utilized for arranging and managing all the essential affairs related to the processes and products of classroom instructions. However, the field of CMI cannot be limited to the boundary walls of the usual classroom and school students. In encircles all types of self-learning and distance education modes and reaches all types of learners and their instructions such as adult learning, mass education programmes, and special

educations, provisions to the exceptional, disable and disadvantageous groups and children of the society. Thus, CMI may be credited nowadays to have the capability of managing the entire spectrum of the teaching-learning or instructional process covering all the fields and areas of our education system.

9.6 Cybernetics

Meaning and Definition of Cybernetics

The cybernetics approach may prove very useful in developing appropriate instructional designs quite self-regulatory and auto-instructional in their execution by properly adopting the mechanism of feedback.

The term cybernetics has been derived from a Greek word Kubernetes meaning *Steersman*. The function of Steersman is to steer the ship or boat in a right way in a right direction. This means that the person should have proper control over the steering function. As and when he gets a hint or communication (feedback) that the boat or ship is going astray, he should exercise control and steer the vehicle again the right direction. In this way, by exercising corrective device and appropriate control with the help of good communication and timely feedback, the steersman is able to regulate the working of his vehicle.

In this similar way, the teacher is the steersman of the teaching-learning process. He has to take along with him the pupils for reaching a set goal by steering out a learning path. For this purpose, the instructional system he chooses must be appropriately controlled. While working with system, if he gets feedback that the system is working properly in terms of output, it will be steered with no change. But if he gets communication that there is something wrong with the system, he will try to set it right. For this purpose, he may have to bring changes in his own method of teaching, the size or quality of the content or learning experiences, interaction with his students, etc. and again the system is put to work after being corrected. This is how a system is controlled by receiving proper communication and feedback about its functioning in right or wrong way. The control in such a case over the system is extrinsic. However good the extrinsic control may be, there are chances of its not being exercised effectively. There may be a gap in receiving communication feedback and responding to it for bringing required improvement in the system. If somehow or the other the system may be made self-functioning and self-regulatory, having an automatic control on its process as required from time to time as a result of the feedback received by it, the system may be termed as an improved system over the extrinsically controlled system. Our own body systems are good examples of such self-regulating systems.

We, as human beings, develop our own actions for detecting and controlling the specific stimuli present in the environment. It brings automatic modification in our own behaviour and body system as a result

of the process of sensory feedback. When we detect foul or good smell in the air, the sensory feedback makes us bring changes in our body system for avoiding or receiving the air as much as possible. The mechanism of homeostasis pertaining to the physiological and biological systems also brings into limelight the process of automatic self-regulatory control. Under this mechanism, our body system constantly works towards maintaining a normal state of balance between input and output. For example, when the blood sugar level in our body drops, the brain, glands, stomach and other organs of the body send out signals (feedback) which activate a hunger drive or hunger motive and make us hungry. After food has been consumed, our body returns to a state of equilibrium. Similarly, when the hot day sets off or disturbs the physical mechanism of our body, it leads to perspiring resulting into a cooler environment. Consequently, the body again comes into a state of equilibrium.

The other examples of such a system are found in the electric and electronic machines such as refrigerator, washing machine, iron, heater, and recording and playing devices. Cybernetics as a developing science and technology aims to help in the building of such a system which is self-regulatory.

As a definition, cybernetics may be termed as the science of communication and control that can help in building as a self-regulatory automatic feedback system similar to that found in animal, men and machines. It stands for a self-regulating automatic system. It can modify its operation in the light of the feedback received by it through its output.

Theory and Mechanism

Cybernetics, as already defined, stands for the science of communication and control. It refers to a self-regulatory automatic system operating in animals, men and machine. The principle can be equally applied on the field of education by taking education or instruction as a system. The main theoretical ideas and principles of cybernetics are outlined now:

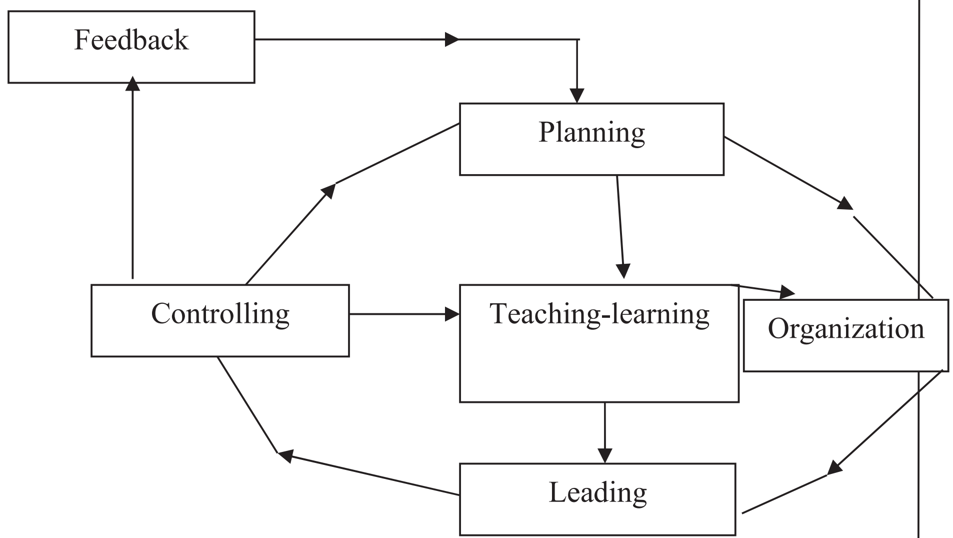
1. **Any system has three basic elements – input, process and output**

The system needs something in the shape of men and material resources for its initial functioning. It is the input. The process unit that works for modifying the input and output is the unit for discharging the results of the process.

2. **The system can be classified as an open loop system and a closed loop system**

The open loop system is not a self-corrective automatic system because it is not able to communicate and provide feedback about its working. But the cybernetic system stands for the closed loop system, in which, as we can observe fig, the output from a system can be effectively returned as input for controlling the future output. It is referred as feedback. This type of effective and dynamic feedback is available only in the closed loop system and it is the central nerve of the cybernetics approach. It is the

communication machinery that alerts the system for adopting self-corrective device, control it's working and making further necessary improvement in its functioning.



A closed loop system of cybernetics.

3. **The feedback mechanism in a cybernetic system**
   As perceived by Smith and Smith (1996), the feedback mechanism is responsible for the following three main functions:
   (i) Generating actions of the system towards a goal.
   (ii) Comparing the effect of this action with the most appropriate way and detecting deficiencies/errors to meet the goals.
   (iii) Utilizing the deficiency/error signals to redirect the system.
   In this way it is the feedback mechanism that is responsible for running a system in a proper way and providing clues for bringing desirable improvement in it for the effective realization of the objectives.

Use in the Development of Instructional Designs

The cybernetics theory and mechanism can be properly applied to the process of instruction for making it a self-regulatory, self-corrective and auto-instructional system. Let us see how it can happen.

- Ordinarily, the teaching or instruction as a system may be supposed to have three major elements - input, process, and output.
- The input elements of the instructional system here will consist of the learning experiences (in the shape of set curriculum, syllabus, etc.) to be given to the students, their needs and entry behaviour, the objectives of teaching, the teacher, the instructional methods, the material and material resources, and the teaching-learning environment.

- In process part, the actual instructional work will be carried out by involving and making use of the input material – human and physical.
- The output part of the teaching or instructional system will bring the outcomes of the instructional process in the form of the students' responses, their gain in knowledge, acquisition of skills, change in attitude and interest, etc. it will also throw light on the effectiveness of the system for the realization of the set instructional objectives.
- For turning the usual system of instruction into a cybernetics system, the main role is to be played by feedback mechanism. The output of the instructional process should properly return as input to control future output. It will automatically work as self-corrective device for detecting the strengths and weaknesses of the input element and also of the process part. After making needed correction and processing it afresh, it will bring improved results in the form of better output which in turn will provide fresh incentive and good feedback for the better functioning of the instructional system. Gradually, the system will yield into a self-regulatory auto-instructional system.
-

A number of cybernetic instructional designs have been developed by the educationists of the advanced countries. We can cite the name of Keller plan developed by Fred Keller and J.G.Sherman for the purpose. We have already discussed the mechanism of this plan for being adopted in the separation or use of PSG in the text. However, for being adopted as a cybernetic instructional design, we are again providing its necessary formalities in the manner given below.

For the development of a cybernetic instructional design the learning material in the Keller plan is divided into units. Each unit is quite comprehensive and meaningful to be completed in a week's duration. The course included in the unit consists of

1. The teacher-generated reading material
2. A study guide with an approach plan based on stated behavioural objectives
3. Four sets of evaluation material (equivalent in terms of testing and difficulty levels).
4.

In the instructional process, the students go through the reading material (quite programmed and structured) with own pace. They are required to read the instructional objectives carefully. They can take the help of the study guide for their independent pursuit. The study guide may suggest their original texts, articles, sources, etc. for their self-instructional activities. After going through a unit, they have to be evaluated. On their request, they are to be given randomly one of the four tests. The results of the test are transferred to them by the concerned tutor. The output works as input in the form of proper feedback for bringing self-correction and improvement to the individual learner. The Keller plan does not need any

formalities of time table, attendance, etc. It is a self-paced auto-instructional plan that leads to mastery learning by independent efforts.

Application and Advantages in Education

Cybernetics is defined as a science of communication and control. It principles and mechanism can be properly in the field of education. Its advantages are summarized here:

1. The teaching and instructional process can be made self-regulatory and auto-instructional by properly adopting the mechanism of feedback as advocated by cybernetics. If we can arrange for the continuous flow of the feedback in the input element of the instructional system, it can reinforce the learner's behaviour for becoming an independent and autonomous one.
2. The basic and central problem in any course of teaching-learning is the proper motivation. However, if we adopt the cybernetics approach, the regular feedback automatically received by the learner may continuously reinforce him for getting due motivation and zeal for self-learning.
3. There can be proper control over the system of instruction as a whole with the application of the principles of cybernetics. With the adoption of this approach, the teachers can exercise full control over their teaching and the learners over their learning for the realization of the set objectives.
4. Cybernetics may be used for developing remedial instructional activities. The feedback provides information about the deficiencies and shortcomings creeping into the system. On the basis of such detection, a proper remedial programme may be chalked out by means of measuring the improvement in output and subsequent feedback.
5. Cybernetics is an automatic feedback system applied to the process of teaching and learning to help the teachers and the learners in their self-improvement. For example, when a teacher is teaching something to a class, e gets feedback from his students that they want to study some other thing in some other way. He gets himself corrected in the light of the feedback. Accordingly, he may bring change in his instructional methodology. The feedback received from time to time and the output of the instructional system will help the teacher for bringing improvement in his teaching. Similar help will also be rendered to the individual learner for bringing self-improvement in his method of learning.
6. Cybernetics as a method of good communication and control can assume the role of a proper training technology. The cybernetics approach with its tool of controlled feedback has been able to give birth to a number of good innovations in the field of teacher education such as micro-teaching, simulated teaching, and interaction analysis. Accordingly, it can be properly utilized for bringing desirable modifications in the

behaviour of teacher trainees and helping them learn appropriate teaching skills.

7. The cybernetics techniques lead to proper individualization of the instruction. Every learner may learn the thing with his own pace. He gets opportunity for self-correction with the help of dynamics feedback. Such individualized auto-instruction has provided the way for proper development of self-instructional material in the form of printed programmed texts and audio and video programmes for spreading the programmes of distance education.

9.7 E- Learning

When it comes to online learning in education, the model has been pretty straightforward – up until the early 2000s education was in a classroom of students with a teacher who led the process. Physical presence was a no-brainer, and any other type of learning was questionable at best. Then the internet happened, and the rest is history.

E-learning is a rapidly growing industry, the effects of which we can trace back to the 1980s and even well before that (in the form of distance learning and televised courses) – these will be discussed later in this ebook.

Now that affordable e-learning solutions exist for both computers and internet, it only takes a good e-learning tool for education to be facilitated from virtually anywhere. Technology has advanced so much that the geographical gap is bridged with the use of tools that make you feel as if you are inside the classroom. E-learning **offers the ability to share material in all kinds of formats** such as videos, slideshows, word documents, and PDFs. Conducting webinars (live online classes) and communicating with professors via chat and message forums is also an option available to users.

There is a plethora of different e-learning systems (otherwise known as Learning Management Systems, or LMSs for short) and methods, which allow for courses to be delivered. With the right tool, various processes can be automated such as a course with set materials and automatically marked tests. E-learning is an affordable (and often free) solution which provides the learners with the ability to fit learning around their lifestyles, effectively allowing even the busiest person to further a career and gain new qualifications.

Some of the most important developments in education have happened since the launch of the internet. These days learners are well versed in the use of smartphones, text messaging and using the internet so participating in and running an online course has become a simple affair. Message boards, social media and various other means of online communication allow learners to keep in touch and discuss course-related matters, whilst providing for a sense of community.

In the fast-paced world of e-learning, the available technologies to make a course new and exciting are always changing, and course content can and should be updated quickly to give students the very latest information. This is especially important if the e-learning training is being

given to employees in a sector where keeping up-to-date on industry developments is of the utmost importance. This is one of the reasons why many businesses are now offering training via e-learning – other reasons include low costs and the ability for employees to study in their own time and place.

Overall, traditional learning is expensive, takes a long time and the results can vary. **The importance of e-learning is now a given fact** and it can offer an alternative that is much faster, cheaper and potentially better.

Definition

A **learning** system based on formalized teaching but with the help of **electronic** resources **is** known as **E-learning**. ... **E-learning can** also be termed as a network enabled transfer of skills and knowledge, and the delivery of education **is** made to a large number of recipients at the same or different times.

The **purpose of e-learning** is to allow people to **learn** for personal accomplishment or to earn a professional degree, without physically attending a traditional university or academic setting.

Let's now look at a few forms of e-learning used to facilitate knowledge transfer.

- Web-based learning. This form of training is accessed via web browsers or through the corporate Intranet.
- Computer-based training.
- CD-ROM based learning.
- Webinars.
- Virtual Classroom.
- Mobile Learning.
- Video-based Learning.
- Custom ELearning.

Characteristics of Learner-Centered eLearning

- Uses inclusive language.
- Provides self-reflection opportunities.
- Allows user-friendly, easy navigation.
- Includes relevant, relatable, real-life scenarios.
- Enables personalization.
- Responds to individual needs.
- Connects through multi-sensory interaction.

The Most Important Benefits of eLearning for Students

- Online Learning Accommodates Everyone's Needs. The online method of learning is best suited for everyone.
- Lectures Can Be Taken Any Number Of Times.
- Offers Access to Updated Content.
- Quick Delivery of Lessons.
- Scalability.

- Consistency.
- Reduced Costs.
- Effectiveness.

E-learning challenges that professional's face almost every day:

- Transforming Dull Subject Matter into Amazing e-learning Experiences. ...
- Lack of Learner Motivation and Engagement.
- Staying Up-To-Date With Modern Tech.
- Designing e-learning Courses for Different Generations.
- Unrealistic Deadlines.

The benefits and drawbacks of online learning

Whether you're a high-school teacher looking to engage your students in a more interactive way, or a corporate trainer hired by a large company to design training curricula, e-learning packs a punch when it comes to benefits that make the creation and delivery processes easier and hassle-free. Important benefits are outlined below.

No Boundaries, No Restrictions

Along with location restrictions, time is one of the issues that learners and teachers both have to face in learning. In the case of face-to-face learning, **the location limits attendance** to a group of learners who have the ability to participate in the area, and in the case of time, it limits the crowd to those who can attend at a specific time. E-learning, on the other hand, facilitates learning without having to organize when and where everyone who is interested in a course can be present.

More Fun

Designing a course in a way that makes it interactive and fun through the **use of multimedia** or the more recently developed methods of *gamification* (further discussed in later chapters) enhances not only your engagement factor but also the relative lifetime of the course material in question.

Cost Effective

This is directed to both learners and teachers, but there is a good chance that whatever your role you had to pay exorbitant amounts of money at some point to acquire updated versions of textbooks for school or college. While textbooks often become obsolete after a certain period of time, the need to constantly acquire new editions is not present in e-learning.

It Just Fits!

As companies and organizations adopt technologies to improve the efficiency of day-to-day operations, the use of the internet becomes a necessity. As multinational corporations expand across the globe, the

chances of working with people from other countries increases, and training all those parties together is an issue that e-learning successfully addresses. And that's a great advantage of online learning!

Let's blend all of that together and apply it in a real-life scenario:

In an effort to enhance the credibility of course material, oftentimes a professor will summon a field specialist to give a lecture relevant to the topic at hand. In the traditional model of education, the professor would have to extend an invitation to said expert, and incur the costs of his flight, stay and training.

With e-learning:

With e-learning the professor has the ability to host a guest lecture without having to spend much money. It can be done virtually, with cameras for both the lecturer and the students, and with the use of microphones to facilitate the same level of interaction that would be possible if the lecturer were physically present in the room. The added benefit comes in when we are able to replay the lecture and gain even more out of it. Students that missed out can view the recording, or students that attended can watch it again to further their understanding.

Concerns that arise with e-learning

Even given all the benefits of e-learning, one cannot deny there are some drawbacks. A good example of a disadvantage of online learning is that practical skills are somewhat harder to pick up from online resources. For example, although building a wooden table is something you can easily share information about, record videos of and explain, the practical experience is essential. Pottery and car engineering are examples of skills that require hands-on experience.

Isolation

Though e-learning offers ease, flexibility and the ability to remotely access a classroom in the student's own time, learners may feel a sense of isolation. This is because **learning online is a solo act for the most part**, which may give the learner the feeling that they are acting completely alone. As technology progresses and e-learning benefits from the advancements being made, learners can now engage more actively with professors or other students using tools such as video conferencing, social media, and discussion forums amongst others.

Health-Related Concerns

E-learning requires the use of a computer and other such devices; this means that **eyestrain, bad posture, and other physical**

problems may affect the learner. When running an online course it's a good practice to send out guidelines about correct sitting posture, desk height, and recommendations for regular breaks.

9. 8 Use of Net search and Websites

A web ***search*** engine or ***Internet search*** engine is a software system that is designed to carry. The methods also change over time as ***Internet usage*** changes and new techniques evolve. Although ***search*** engines are programmed to rank ***websites*** based on some combination of their popularity and relevancy, empirical.

On the **Internet**, **searching** is just trying to find the information you need. The so-called deep Web - that is, the Web sites that have information that can't be indexed by the search engines but can in many cases by **search** directly at the individual Web site.

Types of Search Engine:

1. Crawler Based Search Engines.
2. Directories Search Engines.
3. Hybrid Search Engines.
4. Meta Search Engines.

Most Popular Search Engines in the World (Updated 2019)

- Google.
- Bing.
- Yahoo.
- Ask.com.
- AOL.com.
- Baidu.
- Wolframalpha.
- DuckDuckGo.

Three different types of search queries:

- Navigational search queries.
- Informational search queries.
- Transactional search queries.

Check Your Progress

Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. Define - CAI.

……………………………………………………………………………

……………………………………………………………………………

2. State the uses of Net search and Websites.

……………………………………………………………………………

……………………………………………………………………………

9.9 LET US SUM UP

1. COMPUTER-assisted instructions (CAI) refers to a method of instruction in which there is a purposeful interaction between a learner and the computer device (having useful instructional material as software) for helping the individual learner to achieve the desired instructional objectives with his own pace and abilities at his command.
2. Computer managed instructions (CMI) stand as a category of computer programme that may be used by educators and instructors to organize and manage data related to instruction for attaining the desired institutional objectives most effectively.
3. Cybernetics may be termed as the science of communication and control that can help in building a self-regulatory automatic feedback system similar to that found in animals, men and machines such as refrigerator, washing machine, iron, heater and recording and playing devices, etc. in all of its forms it stands for a self-regulating automatic system that can modify its operation in the light of the feedback received by it through its output.

9.10 UNIT-END EXERCISES

1. Discuss the three technologies of CAI.
2. What is meant by cybernetics? Discuss its theory and mechanism in detail.

9.11 ANSWER TO CHECK YOUR PROGRESS

1. Computer assisted instruction requires a joint effort of various persons in the matter of wise handling of men and material resources. Generally, it involves three types of technologies, namely hardware, software and courseware.

2. The term cybernetics has been derived from a Greek word Kubernetes meaning *Steersman*. The function of Steersman is to steer the ship or boat in a right way in a right direction. The main theoretical ideas and principles of cybernetics are outlined now:

4. Any system has three basic elements – input, process and output

The system needs something in the shape of men and material resources for its initial functioning. It is the input. The process unit that works for modifying the input and output is the unit for discharging the results of the process.

5. The system can be classified as an open loop system and a closed loop system

The open loop system is not a self-corrective automatic system because it is not able to communicate and provide feedback about its working. But the cybernetic system stands for the closed loop system, in which, as we can observe fig, the output from a system can be effectively returned as input for controlling the future output. It is referred as

feedback. This type of effective and dynamic feedback is available only in the closed loop system and it is the central nerve of the cybernetics approach.

9.12 SUGGESTED READINGS

1. Adams, Pamela W., *Computer Application for Teachers*, Charlotte, NC: CPI Training Solutions, 1999.
2. Atkinson, R.C., "Computerized instruction and the learning process", American Psychologist, vol.12, pp. 225-239, 1968.
3. Barry, Clemson, cybernetics: *A New Management Tool*, Tunbridge Wells, Kent: Abacus Press, 1984.
4. Bhatt, B.D. and S.R. Sharma, *Educational Technology*, Delhi: Kanishka Publishing House, 1992.
5. DE Calo Julia E. and Constant A. MAdon (Eds.) *Innovations in Education for the Seventies:* selected Readings, New York: Behvioural publications, 1973.
6. De Carlo Julia E. and constant A. Madon (Eds.), *Innovations in Education for the Seventies*: Selected Readings, New York: Behavioral Publications, 1973.
7. Ellis, Allam B., *The Use and Misuse of Computers in Education*, New York: McGraw-Hill, 1974.
8. Golubchick, Leonard H. and Barry Persky (Eds.), *Innovations in Education, Dubuque,* Iowa: Kendall/Hunt Pub. 1975.
9. Golubchick, Leonard H. and Barry Persky (Eds.), *Innovations in Education*, Dubuque, Lowa: Kendall/Hunt Pub., 1975.
10. Hilgard, R.R. and G.H. Bower, *theories of Learning*, New Delhi: Prentice-Hall of India, 1977.
11. Keller, Fred S. PSI, *The Keller Plan Handbook: Essays on a Personalized system of Instruction*, Menlo Park, Calif.: W.A. Benjamin, 1974.
12. Koch, warren J., *The Use of Computers in Education in Secondary Schools*, Washington D.C.: National Association of Secondary School Principals, 1972.
13. Locard, James, *Computer for Twenty-first Century Educators* (6th ed.) Boston: Pearson, 2004.
14. MAdell, Collen J., *Computers in Education Today*, St. Paul: West Pub., 1989.
15. Merrill, paul F. et al., *Computers in Education*, Englewood Cliffs, N.J.: Prentice-Hall, 1986.
16. Peter Coburn et al., *Practical Guide to Computers in Education* (2nd ed.), Reading, Mass.: Addison-Wesley, 1985.
17. Sherman J.G. and Ruskin Robert S., *The Personalized System of Instruction*, Englewood Cliffs, NJ: Educational Technology Publications, 1978.
18. Smith, K.U. and M.P. Smith, *Cybernetics Principles of Learning and Instructional Design,* New York: Holt, Rinehart and Winston, 1966.

19. Willis, Jerry, *Computers, Teaching and Learning: An Introduction to Computers in Education*, Beaverton, : Dilithium Press, 1983.
20. Young, John F., *Cybernetics*, London, Iliffe: New York: American Elsevier Pub. Co., 1969.

UNIT-10 DISABILITY FRIENDLY TECHNOLOGY

Structure

10.1 INTRODUCTION

Technology in education enables children to adjust to their own pace of learning. Students who need extra time **can** spend more time going over exercises until they understand, whilst students who need less support **can** continue ahead. It also frees up the teacher to help kids who need more support on an individual level. In this unit focus that, disability friendly technology, punarjani, e-learning framework developed by C-DAC, developing technology integrated lesson and sharing e-books with individual and group activities.

10.2 OBJECTIVES

After going through this unit, you will be able to:

- Appropriate used of disability friendly technology
- Know the meaning of punarjani
- Understand the e-learning framework developed by C-DAC
- Developing technology integrated lessons
- Apply sharing e-books with individual and group

10.3 DISABILITY FRIENDLY TECHNOLOGY

Technology in education enables children to adjust to their own pace of learning. Students who need extra time can spend more time going over exercises until they understand, whilst students who need less support can continue ahead. It also frees up the teacher to help kids who need more support on an individual level.

Technology can be utilized to improve teaching and learning and help our students be successful. Through the use of learning management systems (LMS) students can access online resources to get assistance on demand beyond the physical reach of their teacher. Technology can also extend education in another way.

It promotes inclusion and the development of digital literacy skills. It extends learning beyond the text – and beyond the **classroom** walls. It ultimately exposes students and teachers to new online global communities. This in turn promotes a global awareness, which is an essential component to a 21st century education

Assistive Technology: **Accessible technology** is a **technology** that's been designed with the needs of a lot of different users in mind. Its **technology** with built-in customization features so that the user can really individualize their experience to meet their needs.

Examples of Assistive Technology in the Classroom

1. Electronic Worksheets. Students with learning disabilities like dyslexia can use electronic worksheets to complete their assignments.
2. Phonetic Spelling Software. For many children with learning disabilities, reading and writing can be a challenge.
3. Talking Calculators.
4. Variable Speed Recorders.
5. Videotaped Social Skills.

10.4 PUNARJANI

Punarjani (ICT Based Integrated assessment tool for MR Children)

Punarjani-Assessment Tool for the Mentally Retarded: C-DAC Trivandrum is engaged in developing an assessment tool named Punarjani. The system will collect a lot of data about a particular child with Mental retardation like developmental history, school history, home environment, social environment etc. and will be capable of suggesting a long term goal for the disabled. It also helps the teacher concerned to select a suitable strategy

Punarjani is a web based software tool capable of assessment, evaluation and programming a person with mental retardation, based on the inputs from the interdisciplinary team of special educators. This is first of this kind in India for the benefit of persons with mental retardation.

Punarjani integrates the three major RCI approved evaluation and assessment methodologies such as FACP, MDPS and BASIC-MR. Algorithms have been drawn from the currently followed manual process. Strength and needs of each individual are suggested based on these algorithms. Area of achieved independence, area required for strengthening and problem areas are identified for each person. Based on this analysis, optimal long term goal and short term objectives are identified and suitable lesson plan is recommended for each. A grouping algorithm incorporated in the tool helps to create homogenous groups for group teaching of MR children.

Punarjani provides for an inbuilt system for periodic assessment and evaluations. It also helps the special educators to arrive at a comprehensive picture of an individual's performance level in adaptive behaviours. The system follows the principle that the assessment is the first necessary step in program planning, followed by the designing of Individualized Program Plan. It also provides a platform for the quarterly evaluation to determine the effectiveness of the program. New goals and objectives can be set, if needed. The software is equipped to manage the programming of an MR Child from three to eighteen years.

Benefits to Special educators and the society

• Uniformity in assessment/evaluation

• Reducing the subjectivity factor in the assessment

• Special educators are freed from cumbersome manual tasks

• More time for special educators to care the children

• The graphical representation of the development pattern of the MR child 15 training workshops have been conducted on tool at Delhi (5), Ahmedabad (1), kochi (2) , Mumbai (2), Kolkata (1), Bhobal (1), Hyderabad (1), Chennai (1) and Madurai (1). 509 special educators representing 255 special schools from 70 cities/towns of 20 states/UTs have been trained benefitting 20000+ students.

It has been developed by Digital India Corporation, New Delhi and C-DAC, Trivandrum.

Background &Summary:

Punarjani is a web based software tool that is capable of assessment, evaluation and programming for a person with mental retardation, based on the inputs from the interdisciplinary team of special educators. In Punarjani, the evaluation is done for three purposes: **Diagnostic, Instructional, And Progress Monitoring**.
Name of Partnering Agencies: Media Lab Asia, New Delhi and C-DAC, Trivandrum.
Period of Implementation: Nov 15, 2011
Area of Operation: Delhi, India
Objective(s):

The system follows the principle that the assessment is the first necessary step in program planning, followed by the designing of Individualized Program Plan.

This software will aid the teachers for the progress assessment and evaluation of the

Mentally Retarded children. The analysis of the results will be very useful for the teachers as well as the MR children in terms of designing the programme and measuring the development. The software will be capable of generating required graphs and charts on the progress of each child

based on input data provided by the specialist teachers. As almost all special schools follow the same curriculum, a uniform evaluation system and monitoring can be developed and used. This would be of immense help not only in tracking the education and rehabilitation of these children but Also help special educators and other professionals to systematically document the data.

10.5 E-learning Framework developed by C-DAC

E-LEARNING

E-Learning is the utilization of information and communication technologies to mediate asynchronous as well as synchronous learning and teaching activities. E-Learning facilitates flexibility of time, place and pace of study. Today in this busy, modern, technology based world, people want to continue their work and studies from different places.

E-Learning has been evolving continuously with more and more features to facilitate effective learning pedagogies and communication among online learners and with support for interoperable learning management systems. Standardization of learning and course delivery system components has been gaining importance in this field. Specifications like SCORM, QTI and Learner Profiles for Accessibility, Personalization are gaining attention among learning management system providers.

Realizing the potential of e-Learning, C-DAC Hyderabad has started development of technology/products to cater to the needs of e-Learning followers. The current focus of areas is as follows:

- Multilingual E-Learning Framework (eSikshak)
- Quality Analytics for e-Learning Tools & Content
- Walk in ELearning Technology Laboratory
- Collaborative Class Room
- Design and Development of service oriented standards compliant personalized eLearning framework
- Content Generation, Adaptation and Distribution in M-Learning Environment using Mobile Phone Applications
- Adaptable e-Learning Accessibility Model for the Disabled

C-DAC Hyderabad since its establishment has given utmost importance to knowledge dissemination in the areas of its expertise by organizing workshops/seminars etc. E-Learning being one of its core activity, C-DAC, Hyderabad organized ELELTECH INDIA 2001 (National Seminar on e-Learning and e-Learning Technologies during August 7-8, 2001), ELELTECH INDIA 2005 during August 8-9, 2005), ELELTECH India-ASEAN 2006 (International Seminar on e-Learning & e-Learning Technologies for ASEAN country participants during November 6-7, 2006) and ELELTECH INDIA 2009 during November 5-6, 2009) at Hyderabad.

An electronic book, or an **eBook**, is typically distributed as a digital file that can be used on any compatible computer or mobile device.

With the growth in the use of tablets such as the Kindle Fire or the Ipad, **eBooks** have been flying off the digital shelves.

An electronic book, also known as an e-book or eBook, is a book publication made available in digital form, consisting of text, images, or both, readable on the flat-panel display of computers or other electronic devices. Although sometimes defined as "an electronic version of a printed book", some e-books exist without a printed equivalent. E-books can be read on dedicated e-reader devices, but also on any computer device that features a controllable viewing screen, including desktop computers, laptops, tablets and smart phones.

In the 2000s, there was a trend of print and e-book sales moving to the Internet where readers buy traditional paper books and e-books on websites using e-commerce systems. With print books, readers are increasingly browsing through images of the covers of books on publisher or bookstore websites and selecting and ordering titles online; the paper books are then delivered to the reader by mail or another delivery service. With e-books, users can browse through titles online, and then when they select and order titles, the e-book can be sent to them online or the user can download the e-book. At the start of 2012 in the U.S., more e-books were published online than were distributed in hardcover.

ASSISTIVE TECHNOLOGY IN THE CLASSROOM

Whether students have physical impairments, dyslexia or cognitive problems, **assistive technology** can help them to function within the **classroom**. These tools include any type of equipment or device that helps students to compensate for their learning disabilities.

Types of Assistive Devices and How Are They Used

Some examples of assistive technologies are:

- Mobility aids, such as wheelchairs, scooters, walkers, canes, crutches, prosthetic devices, and orthotic devices.
- Hearing aids to help people hear or hear more clearly.
- Cognitive aids, including computer or electrical assistive devices, to help people with memory, attention, or other challenges in their thinking skills.
- Computer software and hardware, such as voice recognition programs, screen readers, and screen enlargement applications, to help people with mobility and sensory impairments use computers and mobile devices.
- Tools such as automatic page turners, book holders, and adapted pencil grips to help learners with disabilities participate in educational activities
- Closed captioning to allow people with hearing problems to watch movies, television programs, and other digital media.
- Physical modifications in the built environment, including ramps, grab bars, and wider doorways to enable access to buildings, businesses, and workplaces.
- Lightweight, high-performance mobility devices that enable persons with disabilities to play sports and be physically active.

- Adaptive switches and utensils to allow those with limited motor skills to eat, play games, and accomplish other activities.
- Devices and features of devices to help perform tasks such as cooking, dressing, and grooming; specialized handles and grips, devices that extend reach, and lights on telephones and doorbells are a few examples.

How can technology help disabled students?

The use of technology in special education helps break the barriers for people with disabilities and provide them with access to the most relevant educational programs. Properly designed software and hardware allow students with special needs to get modern education and achieve any required information online

How does technology help the disabled?

Rehabilitative technology can help restore or improve function in people who have developed a disability due to disease, injury, or aging. ... For example, assistive technology enables students with disabilities to compensate for certain impairments.

Who qualifies for assistive technology?

Children with disabilities who require assistive technology in order to receive a free appropriate public education (FAPE) are eligible for assistive technology devices or services, or both, as a part of the child's special education, related services, or supplemental aids and services.

5 Benefits Of eLearning For Disabled Students

Disabled students are classified into 8 categories according to their disabilities. With the advent of eLearning, education is no longer a laborious work for disabled students. Technology is also playing a pivotal role in providing the perfect learning solutions to the disabled students.

Revealing The Benefits Of eLearning For Disabled Students

There are 8 categories in which disabled students are classified according to their disabilities - medical impairment, mental illness, mobility impairment, hearing impairment, learning disability, vision impairment, acquired brain impairment, and intellectual disability. Because certain individuals are physically and mentally challenged, it does not mean that they cannot perform well in the academics or professional life. With the advent of eLearning, education is no longer a laborious work for disabled students.

There are certain benefits of eLearning for disabled students that they can avail without having any trouble. Some of them deserve a mention here:

1. For Learning Disabilities

Studying online provides the disabled students time and space to work. With eLearning, they can review materials and watch videos lectures as many times as they need. Through the IT systems and softwares, students who have dyslexia or visual processing disorder can manipulate digital text by changing their font style or size which help them in processing the information effectively.

2. For Physical Disabilities

The most obvious benefit for the physically-disabled students is that they stay in their comfort zone without rushing to a campus or commuting between classes to classes. There are integrated technologies for the students who cannot type such as voice-to-text and voice-activated programs.

3. For Visual Impairments

It is easier for visually-impaired students to access their computer to attend the lecture rather than travelling to the campus. The adaptive technologies like Braille keyboards or voice-to-text software and audio recordings are provided for their learning.

4. For Hearing Impairments

Students with hearing impairment can use technology to make their life easier. Through eLearning, they can view video lectures with subtitles, which they cannot experience in the classroom. Text being the primary mode of communication with the teachers and other fellow students can be an easier way of interacting through forums and emails.

5. For Psychiatric Disabilities

Such disabled students can work and study in their own comfort zone. As it gets difficult for them to cope up with the situation and anxiety, hence their known surrounding will help them better to learn through eLearning.

For the disabled students, two main factors are beneficial at every level; convince and flexibility. Online learning provides convenient access for the distant learners and it is more flexible than traditional schooling methods.

There is no hassle of travelling because classes can be attended from home, disabled students can easily set up their home office area according to their personal preferences. Being in their own comfort zone, it will make easier for them to progress more.

Apart from convenience, eLearning provides students some flexibility that is not available in the F2F delivery format. Online courses are developed with Universal Designed Learning (UDL) standards. By this, information of the course is presented in multiple ways.

For example, a reading assignment available in regular text is also available as an audio file. This will automatically give students the flexibility to read or heard the information and to review it often as they need.

Online courses depend more on interactive studies like visuals, graphics, and closed-captioned videos. They are known as a great leveller. Such studies allow students to choose and share what they want to show. Such programs and studies maintain the anonymity about their disability as well. This way all the learners work together towards a common goal of learning and pursuing careers in different fields.

Wrapping Up…

As technology is in everyone's hand in the form of computers, laptop, phone or tablet, attending classes online is far better than commuting to college or universities. The technology that is used for

eLearning allows auditory and visual aspects to be accessible to all learners.

It is also noted that adult disabled students prefer online environment better than the traditional format. Being convenient, flexible and accessible to all the disabled students, eLearning is the most appealing way of encouraging and persuading such students to develop and polish their skills.

In the 21st century, the acceptance of disabilities needs to be promoted among teaching and professional staff and accessibility guidelines need to be developed according to the needs of students, based upon their real-life experiences. Disability is no more a problem as there are many tools, teaching methods and design standards that make everything accessible to the disabled.

How do you engage students with special needs?

Here are some examples of creative ideas to improve classroom engagement:

1. Question Formulation Technique.
2. Turn Instructions and Lessons into Songs.
3. Put Activities on a Menu.
4. Have the Students Create Something.
5. Find the Learning Possibilities in Things Students Love.
6. Special Challenges and Rewards.

THE BENEFITS OF ONLINE ED FOR DISABLED STUDENTS

Although every student should carefully weigh the benefits and considerations of online learning, web-based courses can offer disabled students some additional perks, most notably the convenience and flexibility to accommodate individual needs.

On the other hand, disabled students taking classes online can set up their own home office area to match individual needs and preferences. This will serve them well as they progress along their education and career ladder; online learning via the home office can save money in the long run with regard to transportation costs, and the student will likely be able to use the home office throughout his or her career. Likewise, other daily incidental costs like food and clothing may be reduced; tax deductions may be available that can offset the cost of any needed home accommodations.

C-DAC E-Learning

C-DAC has developed a number of indigenous solutions for content management, evaluation and assessment, virtual classroom, collaboration for e-learning domain. Some of the solutions are listed below.

- E-Shikshak is a learning management system with rich support for Indian languages.

- National Online Examination System (NOES) is an examination system primarily aimed at conducting recruitment.
- Online Labs (Olabs) for school lab experiments provides students with the ease and convenience of conducting experiments over the Internet.
- Veda is a general purpose online testing and question banking system, primarily supporting multiple choice questions (including its variant forms such as match the following).
- Video conferencing solutions for building virtual classrooms supporting synchronous lectures are also available from C-DAC.
- E-Saadhya (SaralAnukulaneyAdhyayan) an Adaptable and Accessible e-Learning framework for the children with mild mental retardation and Autism is being developed with the domain support from National Institute for the Mentally Handicapped (NIMH) with local language support in three Indian languages Hindi, Telugu and Kannada.
- An Academic Networking portal for the faculty members, students, and academic institutions to network and share information about courses, academic events, projects, etc. has been created through a portal called SEEKHA (www.seekha.in)

10.6 DEVELOPING TECHNOLOGY INTEGRATED LESSION

- Integrating technology in special education classrooms
- Autism
- Autism, or Autism Spectrum Disorder (ASD), refers to a range of conditions. These conditions involve challenges with social skills, repetitive behaviors, speech and nonverbal communication. They also involve unique strengths and differences.
- Autism is known as a disability that impairs the social interactions and communication skills of a person. People who are autistic tend to think and act differently than others. Many children with Autism Spectrum Disorder (ASD) find themselves comfortable with a device in their hands. For students with autism, there are apps called "visual scene displays" that are most helpful for children who are having difficulty with verbal skills, according to Jules Csillag, a speech-language pathologist who focuses on special ed tech. Apps such as SceneSpeak and Speech with Milo help autistic children develop storytelling skills with text-to-speech voice and interactive storybooks. Using apps like these in a classroom can improve autistic student's verbal skills.
- There are several controversies surrounding the diagnoses and causes of autism. It's now believed that there's no single cause of autism. Research seems to suggest that autism is normally the result of both genetic and environmental influences.

Down syndrome

- If a student has down syndrome, assistive technology can help with their learning experience. Author of *Down syndrome: A Promising Future, Together,* Terry Hassold, who got his PhD in human genetics, explains that students with Down syndrome have delays with cognitive ability. Their brains have a late reaction when their neurological system sends a message for any task. Because of this late reaction, they tend to take longer to complete a task than an average students. Assistive technology is crucial in helping Down's students with their writing ability. Down syndrome children tend to have shorter fingers and a lowered thumb making their ability to write more difficult. Also, some of the usual wrist bones are not formed, making it difficult to hold objects. Slanted desks are one type of assisted technology that can aid in the successful ability to write. A three-ring binder can be used to create a slanted desk by turning the binder sideways. Also, students with Down syndrome often try to hold their pencils by anchoring them against the thumb rather than using the tip of their thumb. Shortened pencils or triangular-shaped pencils encourage students to hold them correctly. Using any of these assistive technologies can help down syndrome students during their educational process.

10.7 SHARING E-BOOKS WITH INDIVIDUAL AND GROUP

Bookshare® is an ebook library that **makes** reading easier.

- Members can access a huge collection of ebooks and read their way with the most customizable ebooks for people with reading barriers. **Bookshare** is an initiative of Benetech, a nonprofit that empowers communities with software for social good.
- A yearly **Bookshare** subscription is $50 for most Individual Members; however the subscription **cost** varies depending on country. You can find more information about subscription **costs** on our Subscription **Fees** page. To sign up for an Individual Membership, please visit our Sign Up page.

- Ople with reading barriers face numerous challenges. According to the World Health Organization, an estimated 285 million people worldwide are visually impaired, 90% of whom live in developing countries. An even higher number of people have dyslexia or a language-based learning disability that makes it difficult or impossible to read printed text. UNESCO has reported that if all students in low income countries left school with basic reading skills, 171 million people could be lifted out of poverty, equivalent to a 12% cut in world poverty.
- **Bookshare® is an ebook library that makes reading easier.** Members can access a huge collection of ebooks and *read*

their way with the most customizable ebooks for people with reading barriers.

- The library has 774,156 titles and is the most extensive collection of accessible ebooks in the world. It includes books for school, career, and reading pleasure, as well as titles in over 34 languages. The collection is supported by a dedicated volunteer community and partnerships with over 820 US and international publishers.
- Bookshare operates in the U.S. under a copyright exemption—the Chafee Amendment—which grants nonprofit organizations the ability to make books available to people with print disabilities without publisher permission. Bookshare receives publisher permission to provide books to members outside the U.S.
- Thanks to funding from the U.S. Department of Education, Office of Special Education Programs (OSEP), Bookshare is free for all qualified U.S. students and schools. Qualified individuals who are not students pay a nominal annual fee for their membership, including reduced fees in some countries outside the U.S.
- Bookshare is an initiative of Benetech, a nonprofit that empowers communities with software for social good.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. What is the disability friendly technology?

…………………………………………………………………………

…………………….………………………………………….…………

2. Describe the developing technology integrated lessons?

…………………………………………………………………………

…………………………………………………….……………………

10.8 LET US SUM UP

In this unit you have learnt disability friendly technology, punarjani, and e-learning frame work developed by C-DAC, developing technology integrated lessons and sharing e-books with individual and group.

10.9 UNIT – END -EXERCISES

1. Define Punarjani.
2. How can use in the assistive technology for special children?

10.10 ANSWER TO CHECK YOUR PROGRESS

1. Punarjani-Assessment Tool for the Mentally Retarded: C-DAC Trivandrum is engaged in developing an assessment tool named Punarjani. The system will collect a lot of data about a particular child with Mental retardation like developmental history, school history, home environment, social environment etc. and will be capable of suggesting a long term goal for the disabled.

2. The following ways used in the assistive technology for special children.

- Mobility aids, such as wheelchairs, scooters, walkers, canes, crutches, prosthetic devices, and orthotic devices.
- Hearing aids to help people hear or hear more clearly.
- Cognitive aids, including computer or electrical assistive devices, to help people with memory, attention, or other challenges in their thinking skills.
- Computer software and hardware, such as voice recognition programs, screen readers, and screen enlargement applications, to help people with mobility and sensory impairments use computers and mobile devices.
- Tools such as automatic page turners, book holders, and adapted pencil grips to help learners with disabilities participate in educational activities
- Closed captioning to allow people with hearing problems to watch movies, television programs, and other digital media.
- Physical modifications in the built environment, including ramps, grab bars, and wider doorways to enable access to buildings, businesses, and workplaces.
- Lightweight, high-performance mobility devices that enable persons with disabilities to play sports and be physically active.
- Adaptive switches and utensils to allow those with limited motor skills to eat, play games, and accomplish other activities.
- Devices and features of devices to help perform tasks such as cooking, dressing, and grooming; specialized handles and grips, devices that extend reach, and lights on telephones and doorbells are a few examples.

10.11 SUGGESTED READINGS

1. Aktamis H and Ergin O 2008 The Effect of Scientific Process Skill Education on Students' Scientific Creativity, Science Attitudes and Academic Achievement *Asia-Pasific Forum on Science Learning and Teaching*
2. Ashworth, P and Bannister, P. (1997). Guilty in whose eyes? University students' perceptions of cheating and plagiarism in academic work and assessment. *Studies in Higher Education*,

3. Bullock, D. (2004). Moving from theory to practice: An examination of the factors that pre- service teachers encounter as the attempt to gain experience teaching with technology during field placement experiences.
4. Dexter, S., & Riedel, E. (2003). Why improving pre-service teacher educational technology preparation must go beyond the college's walls.
5. Harrington, R. A. (2008). The development of pre-service teachers' technology specific pedagogy.
6. Koehler, M. J., & Mishra, P. (2005a). Teachers learning technology by design. Journal of Computing in Teacher Education.

UNIT –XI IMPLICATIONS OF TECHNOLOGY BASED INSTRUCTION IN INCLUSION

Structure

11.1 INTRODUCTION

Many ICTs can be used as a didactical tool to enable a more inclusive learning environment. Communication uses technologies that can enable communication often referred to as alternative and augmentative communication devices and strategies. In this unit focus that, implications of technology based instruction in inclusion, digital storytelling with children, co-create digital books with photos of the children's play and digital audio filed with the child as the narrator.

11.2 OBJECTIVES

After going through this unit, you will be able to:

- Understand the implication of technology based instruction
- Describe the digital story telling with children
- Know the digital audio files with the child as the narrator

11.3 Implications of Technology based instruction in Inclusion

Many ICTs can be used as a didactical tool to enable a more inclusive learning environment. Communication uses technologies that can enable communication often referred to as alternative and augmentative communication devices and strategies.

Technology based instruction in inclusion

Accessible technology can serve an important role in inclusion of students with disabilities. Not all technology is accessible, however. First, we will define accessible technology, and give examples of both accessible technology and inaccessible technology. Then we'll have a two part section on how it maximizes inclusion, by helping students with disabilities learn

and by incorporating the concepts of universal design into learning. Lastly, we'll talk about some barriers you might face

According to technology based instruction, "Accessible electronic and information technology is technology that can be used by people with a wide range of abilities and disabilities. It incorporates the principles of universal design," and it includes "computer hardware and software, operating systems, web-based information and applications, telephones and other telecommunications products, video equipment and multimedia products, information kiosks, and office products such as photocopiers and fax machines."

To break that down, it means that accessible technology can be used by a wide variety of people, including people with disabilities. Its primary purpose is to make sure that people with disabilities can fully participate - hence being accessible - but can be used by anyone, and benefit anyone.

Some examples of accessible materials are:

- Closed captions on videos
- Transcripts for videos
- Audio transcripts for if the person does not have a screen reader
- Alternatives to sound cues
- Flexible formatting
- Logical order to content that is easy to understand
- Alt text for images
- Navigation is mouse-free
- Formatting can be changed to meet preferences
- Compatibility with text to speech and supported reading software
- Time limit extensions for responses that have time limits

Some examples of inaccessible materials are:

- Uncaptioned videos
- Content that is organized randomly and without order
- Images without alt text
- Formatting that cannot be adjusted
- Incompatibility with text to speech and supported reading software
- Navigation cannot be mouse-free
- Sound cues are the only option
- Untranscribed videos
- No audio transcripts for text

Maximizing Inclusion, Part One: How It Helps Students with Disabilities

What are the benefits of accessible tech? How does it help students with disabilities learn? Accessible tech obviously creates more access for disabled students to learn. If the materials are accessible, they can fully participate and learn from the material. They able to participate and be included because they are not being left out and left behind.

You can learn specifics of ways to make specific technology accessible, and more about acquiring digitally accessible materials and making them accessible at the National Center on Accessible Educational Materials' webinar on the subject, and at technology based instruction

Maximizing Inclusion, Part Two: Accessible Tech for Everyone

How does accessible tech incorporate elements of universal design? How does universal design benefit everyone? Because it is designed to have options that can be toggled at will - countering one of the common arguments that having too many options would be confusing - it can be adjusted to meet anyone's needs or preferences.

A student does not have to be disabled to benefit from accessible tech - if they prefer a certain format, then logic follows that they will learn best from that format and possibly enjoy it more. In addition, some students could be undiagnosed and will also benefit from a wide variety of options.

Universal Design for Learning (UDL) follows the same principles - designed with a wide variety of students in mind to reach said wide variety of students. And universal design fosters disability acceptance by making commonplace the needs of disabled students - they aren't seen as special or extra or as accommodations that are exceptions to the usual rule.

Thus, it creates social inclusion (by making commonplace disabled students' needs, so that the students and their needs are less bothered) and educational inclusion (by making sure everyone is included under the umbrella of options).

Barriers of Technology based instruction in the Classroom Accessible

One potential barrier is the cost of the accessible technology. A possible solution would be: If you are in a position to advocate for accessible technology, point out that universal design can ultimately cost less because they are spending less money on individual accommodations.

Another potential barrier is conflicting access needs (when someone's need for something to participate conflicts with someone else's). A possible solution would be to create different versions of the teaching lesson, or try and reach a compromise. One resource is this guide on Conflicting Access Needs, and another is this blog post by Real Social Skills.

Retrofitting existing digital materials is nearly impossible - according to a report by the Center on Online Learning, “The combination of rich media text, audio, images and video/animations and the multi-faceted sophistication of CMS/LMS platforms easily overwhelms the capacity of schools to modify or even create accommodations for accessibility.” One solution would be to carefully review digital material you plan to assign for accessibility, and assign materials that are accessible.

11.4 Digital Storytelling with children

Storytelling has a rich tradition, and it has evolved and expanded to assume a dynamic, contemporary presence across settings and functions. Emergent digital methods are changing the nature of storytelling and opening new possibilities for collaborative approaches. These methods encourage repositioning learners as co producers of knowledge who partner in the definition of problems, formulation of theories, and the application of solutions in the learning environment. The simplification, interactivity, and affordability of technology have led to a rapid and diverse expansion of participatory storytelling strategies.

Digital storytelling simply means the use of something digital when telling a story. In essence digital stories are those that make use of photographs, videos, animation, sound, music and text.

Storytelling can, of course, be about the production of an existing story or creation of your own.

For a child, this allows the coming together of skills they are learning in English, art & design and computing, providing endless opportunities.

It is absolutely appropriate for parents to be concerned about excessive use of digital and screens. There is no doubt that excessive screen-time, encouraging children to communicate largely via a screen rather than in person and children becoming sedentary and insular, have very serious consequences. Should it therefore follow that we should encourage children away from digital and screens wherever possible? In the case of digital storytelling, I would say no.

In this case, digital storytelling in many of its forms avoids several of the criticisms of screen-based play. It typically gets children moving (taking photos, shooting video) and interacting in the real world both to create their stories and deliver them. Developmentally digital storytelling offers huge opportunities (see below) as well as being something children find great fun and extremely engaging.

OPPORTUNITIES OF DIGITAL STORYTELLING WITH CHILDREN

Confidence:

In practically all its guises digital storytelling is a great way to build a child's confidence. For example, if a child is too shy to perform in public, recording a performance on a mobile phone and playing it back for friends and family can be a much less daunting starting point.

Creating something as a team or alone is equally a wonderful way to support self-esteem development as children discover they really can come up with and/or deliver their own stories.

The breadth of digital options means that children aren't restricted by their ability to draw, write or act, as there are so many other options to explore too.

Creativity:

Being creative is incredibly rewarding at any age and so important to a child's development. It helps to build invaluable life skills from problem solving to self-expression. It enables children to explore their personality, develop confidence and practice all sorts of skills often touching on social, emotional, cognitive, and physical and language along the way. Story creation in any form is creative, empowering for the imagination, and digital storytelling opens up a huge range of additional creative avenues.

Preparation for adult life:

So many roles in society use skills developed through digital storytelling. There are of course obvious roles like film directors, actors and actresses, producers, photographers, authors, journalists and many others from sales and marketing to graphic design. In reality the skills required to put together a good story and present it in any way are useful in virtually any role and digital storytelling is a really fun way to practice these.

Language and literacy:

Digital storytelling in some forms could be criticized for taking children away from writing and language development but this does not have to be the case. We would encourage digital storytelling to retain a written element and look for other opportunities to extend writing, spelling and language skills through digital storytelling. For example, at Fundamentally Children we are currently reviewing the Night Zookeeper platform which encourages story creation through an online tool that helps to inspire creativity and challenge the writer with missions, requirement to use particular words within the narrative and similar.

IDEAS FOR DIGITAL STORYTELLING

If you are keen to get involved with digital storytelling, here are a few ideas to try:

- Start small: Get your child to read or perform their favorite book and record it on video to share with friends and relatives
- Photo stories: Give your child a camera and challenge them to take five pictures and turn it into a story. Or you can turn it into a game to play together - one takes the pictures and the other person makes up the story to go with them. Inspire them to take pictures of unusual or disconnected things and see if they can join them together into a narrative
- Stop animation: There are a variety of stop animation tools (available for computers, mobiles and tablets) that offer a great opportunity for digital storytelling.

11.5 Co-Create digital books with photos of the children's play or work

An electronic book, also known as an e-book or eBook, is a book publication made available in digital form, consisting of text, images, or both, readable on the flat-panel display of computers or other electronic devices. Although sometimes defined as "an electronic version of a printed book" some e-books exist without a printed equivalent. E-books can be read on dedicated e-reader devices, but also on any computer device that features a controllable viewing screen, including desktop computers, laptops, tablets and smart phones.

Now let us take a look at how to create digital textbooks:

1. Step 1: Select the Layout Template. The layout of a digital textbook depends on the grade for which it is being made and the subject of the eBook.
2. Step 2: Select the Cover Image.
3. Step 3: Add Content and Interactivity.
4. Step 4: Add Table of Contents.
5. Step 5: Publish.

E-Books do not need an introduction in today's age. Most schools and educational institutes have adopted eBooks or digital textbooks as part of their courseware. Students are also no stranger to digital textbooks and its multiple advantages, thanks to everyday Smartphone usage.

Though eBooks have been around for almost a decade, it has only been a few years since it has picked up the pace and been fully integrated into the modern education system. And it is evident from the fact that today there are numerous software tools available to create digital textbooks.

With features so simple that there's no longer a need for multiple teams to handle the book production process, teachers can themselves create a compelling digital textbook with all the required features and functions that they deem appropriate for a student's learning experience. It has eased work for publishers as well by eliminating a lot of steps and making eBook creation a cost-effective and time-saving process.

The layout of a digital textbook depends on the grade for which it is being made and the subject of the eBook. So, whether you are designing digital textbooks for K-12 or higher education students, the first thing you need to determine is what kind of eBook do you want to create? Is it going to be text heavy with images used sparingly? Or is it going to contain a lot of diagrams and charts? Based on this, you can decide which layout you should go for- fixed or reflow able.

Also, here you can decide upon other aesthetics of your digital textbook. The font style, font size, color, page border, etc. With eBook creation software, all this can be done in a very efficient and simple manner.

It's as easy as drag and drop. At the click of a button, you will have your layout ready. EBook creation software has a lot of inbuilt templates which you can choose from, and which you can tweak as per your liking.

Step 2: Select the Cover Image

The cover image is always crucial as it's the first thing that attracts the reader to a book. Even in the case of educational books, you need to give importance to the cover image as there are many other digital textbooks available on the eStore for students to browse through.

Make the cover image relevant and interesting. You can either upload a design of your own choice or go for an existing template, if available.

To compete with the big publishers, you need to make a feature-rich digital textbook that covers all the relevant topics that a student requires. Cover image/thumbnail image is just something that gives out the first impression of your eBook. Ensure that the thumbnail image is clear enough to be seen on a small screen device.



Step 3: Add Content and Interactivity

You can either add a PDF or doc file to the software, which will then be converted to an ePUB file. Or you can start writing directly on the eBook creation software, whichever suits you.

A lot of the digital book creation platforms have the authoring feature which allows the user to write content directly on the software and then enhance it further. Once the ePUB file is ready, you can now start enriching the digital textbook.

Interactive features are what set digital textbooks apart from printed paperback textbooks. So, add interactivities to keep the readers engaged. Apart from multimedia elements like audio, video, and images, you can embed the content with augmented reality to create an immersive learning experience.

Online assessments can be added which include multiple evaluation techniques to monitor students' knowledge retention capacity and assess their understanding.



Step 4: Add Table of Contents

And finally, once everything is done, you create the table of contents. This is to be done last. In digital textbook creation process, the TOC is automatically created with all the topics corresponding to the

correct page numbers. Once it is created, ensure that it links to the right pages.

Step 5: Publish

After ensuring that everything's in place, hit publish. Your digital textbook is now ready to be distributed. The licensing and distribution bit is taken care of in this stage. It's up to the publisher and educational institute whether they want to create a group license or an individual license.

While you're creating the digital textbooks, you also need to plan on how to make the digital eBooks available to the students. Publishers are adopting various means to make profitable deals out of digital textbook sales. They are not only selling books on eStores, but are also renting out eBooks on subscription basis.

But the first thing you require to create digital textbooks is an eBook creation platform. Selecting the right eBook creation platform is extremely important as without the right platform you might not be able to create a book that you intended for. Here are a few things to consider before selecting eBook creation software.

- Ensure that it has an easy-to-use interface
- Check whether the software accepts different input formats
- The software must ensure secure creation and delivery of content
- The software must be compatible with multiple operating platforms
- Check the types and formats of interactive elements that the tool supports

With the help of eBook creation software tools and packages, it has become very easy for educational publishers to create and publish eBooks. Although the print book sales are dwindling, eBook is a safe investment as people are evidently going for a digital future.

With smartphones and tablets becoming almost a necessity, it is convenient to leverage these mediums to create and deliver interactive eBooks for students. Using digital textbooks will help publishers to create cost-effective eBooks and sell them to students at an affordable price; while students get access to quality learning materials, complete with interactivities and engaging content, providing them a better learning experience.

11.6 Digital Audio files with the child as the narrator

AA and AAX-- Audible audio FILE format. Audio book format, which is a variable-bitrate (allowing high quality) M4B file encrypted with DRM. MPB contains AAC or ALAC encoded audio in an MPEG-4 container.

These two audiobook file formats .aax and .aa is created by Audible.

Child-narrated stories are usually written from the first person perspective and may be divided into two different types: In the first the narrator is the age of the child and allows the reader to discover and learn new things along with them; in the second the narrator is distinguishably older and is only remembering . Merely taking a brief look into any list of recently published child-narrated books no one can doubt the immense popularity of this genre right now. With novels such as Jonathan Safran Foer's *Extremely Loud and Incredibly Close* being adapted into full-length feature films the technique of child narration, generally known thanks to such literary classics as *Huckleberry Finn* or *To Kill a Mockingbird*, is receiving ever more attention and inspiring other writers to make use of it in their own works. There is a plethora of potential reasons for the widespread appeal of this technique, all of which will be discussed later on.

Perhaps the most fundamental one, though, has to do with the relationship between the reader and the narrating character of the child. In her *Daily Herald Tribune* article the correspondent Alexis Kienlen writes that, „Children and teenagers have intense emotions, and are establishing their identities, which gives them a unique perspective on life and a certain tone to their narration"(Kienlen). We may argue that one of the characteristic features of this tone of narration is its universality. In simple terms, it is easy for us to sympathize with the child narrator, to get into their skin, because at one point or another we were all children, and to a certain extent we still remember what it was like for us at the time.

This is a very adult-centric approach, of course, so it should be also mentioned that child narrators provide perfect opportunities for identification to children as well.

CHILD'S PERSPECTIVE

The *child's perspective* refers to the *child's* own experiences, perceptions and understandings of a certain situation, whereas the *child perspective* denotes an external, adult *perspective* on the *child* and its needs in the same situation.

Accessible tech plays an important role in inclusion of disabled students, both educationally and socially, through disability acceptance and making sure students aren't left out and left behind. It enhances all students' learning experiences, not just disabled students'. Some barriers to having accessible tech exist, but solutions can sometimes be found. It is vital to make sure the materials are accessible from the start so that everyone can reap the benefits.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. Describe the implications of technology based instruction in inclusion.

…………………………………………………………………………
……………………..…………………………………….…………

2. What is digital storytelling method?

…………………………………………………………………………

11.7 LET US SUM UP

In this unit you have learnt implications of technology based instruction in inclusion, digital storytelling with children, Co-create digital books with photos of the children's play and digital audio files

11.8 UNIT-END EXERCISES

1. What are the ideas for digital story telling?
2 How will you select eBook creation software?

11.9 ANSWER TO CHECK YOUR PROGRESS

1. **IDEAS FOR DIGITAL STORYTELLING**

Start small: Get your child to read or perform their favorite book and record it on video to share with friends and relatives

Photo stories: Give your child a camera and challenge them to take five pictures and turn it into a story. Or you can turn it into a game to play together - one takes the pictures and the other person makes up the story to go with them. Inspire them to take pictures of unusual or disconnected things and see if they can join them together into a narrative

Stop animation: There are a variety of stop animation tools (available for computers, mobiles and tablets) that offer a great opportunity for digital storytelling.

2. Ensure that it has an easy-to-use interface

- Check whether the software accepts different input formats
- The software must ensure secure creation and delivery of content
- The software must be compatible with multiple operating platforms

11.10 SUGGESTED READINGS

1. Ayres, K. M. and Langone, J. 2002. Acquisition and generalization of purchasing skills using a video enhanced computer-based instructional program.. *Journal of Special Education Technology*,
2. Lancioni, G. E., Van den Hof, E., Furniss, F., O'Reilly, M. F. and Cunha, B. 1999. Evaluation of a computer-aided system providing pictorial task instructions and prompts to people with severe intellectual disability.
3. Mechling, L. C., Gast, D. L. and Langone, J. 2002. Computer-based video instruction to teach persons with moderate intellectual disabilities to read grocery aisle signs and locate items.
4. Kurt, G (2012). Developing technological pedagogical content knowledge of Turkish pre- service teachers of English through a

design study. Unpublished doctoral dissertation, Yeditepe University, Turkey.

5. Graham, C., Borup, J., & Smith, N. (2012). Using TPACK as a framework to understand teacher candidates' technology integration decisions.

UNIT-12 APPLICATION OF TECHNOLOGY

Structure

12.1 INTRODUCTION

A worksheet, in the word's original meaning, is a sheet of paper on which one performs work. They come in many forms, most commonly associated with children's school work assignments, tax forms, and accounting or other business environments. Software is increasingly taking over the paper-based worksheet. In this unit focus that, insight into the writing of a report, worksheet preparation qualities or characteristics of good report and evaluation, using technology for evaluation, assessment and advantages of technology for evaluation.

12.2 OBJECTIVES

After going through this unit, you will be able to:

- Know application of technology
- Explain the concept of worksheet preparation
- Understand the features of Excel
- Navigate worksheets
- Explain the characteristics of good or essential report
- Understand the advantages of technology for evaluation

12.3 WORKSHEET PREPARATION – MEANING

WORKSHEET: DEFINITION, TYPES, PREPARATION PROCESS

A Worksheet is a collection of cells organized in rows and columns. Each worksheet contains 1048576 rows and 16384 columns and serves as a

giant table that allows you to organize information. Typically, a workbook contains several worksheets with related content and only one of the worksheets is active at a time.

A worksheet, in the word's original meaning, is a sheet of paper on which one performs work. They come in many forms, most commonly associated with children's school work assignments, tax forms, and accounting or other business environments. Software is increasingly taking over the paper-based worksheet.

It can be a printed page that a child completes with a writing instrument. No other materials are needed. It is "a sheet of paper on which work schedules, working time, special instructions, etc. are recorded. A piece or scrap of paper on which problems, ideas, or the like, are set down in tentative form." A worksheet may have questions for students and places to record answers. Multiple column sheets wherein all necessary information used for the preparation of the financial statement is recorded in a systematic process are called worksheet.

Worksheet generators are often used to develop the type of worksheets that contain a collection of similar problems. A worksheet generator is a software program that quickly generates a collection of problems, particularly in mathematics or numeracy. Such software is often used by teachers to make classroom materials and tests led a worksheet.

WORKSHEET PREPARATION

It is a device used for an easy preparation of adjusting entries and financial statements. The worksheet is a multi-column sheet or a computer spreadsheet where accountant writes, in brief, information necessary for preparation of adjusting entries and financial statements.

12.4 WORKSHEETS HELP TO STUDENTS LEARNING

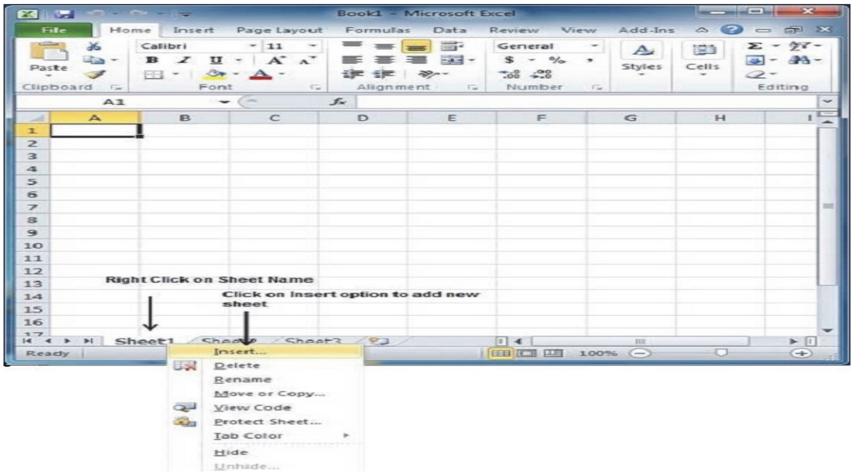
Worksheets are an effective tool in ongoing efforts encouraging our students to engage their brains during class. Worksheets used in class can also help direct students learning out-of-class.

ACTIVITY SHEET

An activity sheet is commonly a piece of paper with questions or activities. Students can either place their answers or perform the specific activity. In addition to that, the activity sheet is also used to record the activities done by a person, a group of people, a family, or an organization.

SPREADSHEET AND ITS FUNCTIONS

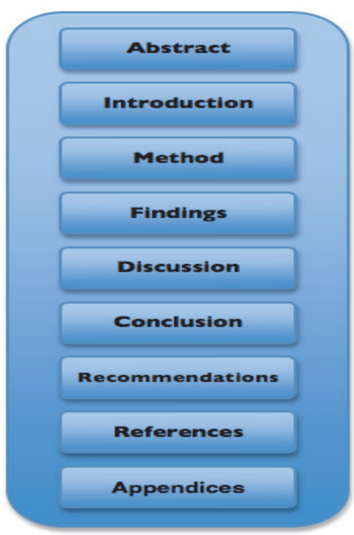
A function is a predefined formula that performs calculations using specific values in a particular order. All spreadsheet programs include common functions that can be used for quickly finding the sum, average, count, maximum value, and minimum value for a range of cells.



12.5 REPORT WRITING

A report provides clearly organised information and/or data about a situation or problem under investigation. The information/data may come from your experience, your reading, your research, experiments or measurements conducted in a laboratory or out in the field. Your assignment might specify the type of audience for your report – e.g. non-specialist readers, specialists in your field of study. If unsure, clarify with your lecturer. Knowing your audience will determine how much information and how much context you need to provide, and the choice of technical and non-technical language in your writing.

Typical report structure



A technical report should contain the following:

1. The title page. The title page comes first when you write your report. ...
2. Introduction. In the introduction, you are supposed to highlight the main aims of the paper to the reader. ...

3. The summary.
4. Experimental details.
5. Results and discussions.
6. The body.
7. Conclusions.

Introduction

- The introduction provides an overview of the report.
- Describe your aims and objectives explicitly, and the context of the problem or situation.
- If relevant, indicate the scope or limitations of your investigation.
- If necessary, provide a brief historical background (with subheadings) of significant events leading up to the present investigation.
- If the explanation of the context is lengthy, you may want to make it a separate section and call it Background/Context/Definitions/Key Terms.
- If you are required to provide an analysis of existing research, you will need a separate section called Literature Review.
- Use the present tense to outline the problem and your aims.
- Use the past tense to describe events that have occurred when giving background information or context.

Method

- List the procedures and processes undertaken in your investigation in clear order. If necessary, use subheadings like Sample, Instruments.
- For a technical report, you may need to include descriptions of materials, equipment and resources.
- Use the past tense as the events of the research are over.
- Unless you are told specifically to write in first person, choose impersonal sentence structures such as passive constructions, e.g. 20 students were selected randomly to form the sample group instead of I selected 20 students randomly to form the sample group.

Findings, results and data

- Present your information in a clear and logical sequence.
- You may want to use charts, tables, graphs and pictures to demonstrate your results. These are collectively called ‘figures’ in a report. Make sure that each of these is labeled and numbered consecutively.
- If you have a large amount of empirical results, include them in an appendix.
- Use the past tense and passive construction to describe what was found, in keeping with the impersonal tone of the report.

Discussion and analysis

- This section explains and argues the interpretation of the evidence in the report.
- Use the present tense to discuss the ongoing situation as revealed in the investigation. Check with your lecturer whether you should adopt a personal or impersonal tone in the discussion.

Conclusion

- This section is like the conclusion of an essay – it provides an overall purpose of the report, the steps through which it has progressed, and its overall findings and point of view.
- No new material should be included in the conclusion.

Recommendations and implications

- If the nature of the report has been to identify actions to be taken as a result of the findings, they should be listed here sequentially.
- Use the past tense to review what the report found, and comment in the present tense.

References

Ensure that your report has a reference list at the end. The list should not be included in the word count unless you are instructed to do so by your lecturer as an exception to the rule.

- It demonstrates that you have researched the area.
- It demonstrates that you are enlisting the support of someone's research to support your own ideas and findings.
- It demonstrates what ideas or information you have referred to from someone's research as distinct from your own.
- It demonstrates that you acknowledge and give credit to the work of someone else.
- Makes sure that you are familiar with the referencing style as prescribed by your faculty.
- Only includes those references that you have used in your report (i.e. those that you have cited in the report).

Appendices

- An appendix is any extra material that you wish to include at the end of your report for the audience to consider
- It may be that it is not essential in the body of the report itself, or is too lengthy and would interrupt the flow of information
- In some cases, it may be evidential material on which your findings are based (e.g. statistical calculations or data from another source)
- Each appendix should be titled and numbered (e.g. Appendix A, Appendix B), and listed in the table of contents

Report Types: Top 8 Types of Reports

- Type # 2. Short or Long Reports:
- Type # 3. Informational or Analytical Reports:
- Type # 4. Proposal Report:

- Type # 5. Vertical or Lateral Reports:
- Type # 6. Internal or External Reports:
- Type # 7. Periodic Reports:
- Type # 8. Functional Reports:

12.6 Qualities or characteristics of Good or Essential report

1. Suitable Title

A suitable title has to be provided to each report according to the nature of contents. It should also highlight upon its origin and the person for whom it is being prepared.

2. Simple

A report should be readable by an ordinary layman and in known language. Such type of simple style of language is used in the report preparation. As far as possible, **scientific or technical language is best left out of reports**, unless it becomes unavoidable. In case the reports are of regular nature, it is preferable to get language more or less standardized.

3. Promptness

A report **should be prepared and submitted within short span of time or time stipulated** by the request letter. Information delayed is information denied. At the same time, accuracy of information should not be given up at the cost of achieving objective of promptness. The following steps may be taken to collect the information as early as possible.

- Accounting records should be kept in such a way that fulfill the requirements of submission of different reports.
- Mechanical devices can be used for record keeping at the maximum to avoid clerical errors and increase productivity.
- Accounting work should be departmentalized in order to prevent bottle necks in reporting.
- In the case of prevailing abnormal or extra-ordinary situation, the employees are asked to report the same immediately.

4. Comparability

Sometimes a report is prepared with some comparative information. In this case, standard information is compared with actual information. If not so, current year information is compared with last year information. In certain cases, the prospective information is prepared well in advance and the actual information is compared. The main objective of comparability is to highlight significant variations.

5. Consistency

A report **should be prepared for many years from the same type of information and statistical data**. If so, there is a possibility of preparing a report in consistency. It is possible if same accounting principles and concepts are used for collecting, classifying, tabulating and

presenting the information. The usage of report is increased through consistency.

6. Precise and Accurate

A report should be precise, accurate and specific. It can be just a bad reporting practice to supply too much information which over whelms the order; as too little which leaves him guessing. If report is quite long or detailed, then a synopsis should be prepared to cover all significant facts and conclusions.

7. Relevant Information

Relevant accurate data is alone included in the report. If not so, it will involve unnecessary expenditure and the reports will be a waste.

8. Presented to Required Person or Group or Department

The reports **should be specific and presented only to the person in need**. Sometimes, reports are sent to various departments in a routine way, if so, the reports are prepared in such a way that includes common information.

9. Routine Details

Every report **should contain the routine detail**s like the period of time of preparing report, the period covered in the report, date of presentation of report, the units of information, the name of the person preparing and presenting it, names of persons to whom it is being submitted. etc.

10. Timeliness

A report **should be prepared and presented within the stipulated time**. If a report is received late, there is no meaning of preparing such report and no use for management. If the report is presented in time, necessary actions may be taken.

Obviously financial data are more valuable when the events are fresh in the minds of users. The element of time elapsing between the events and the report determines to a large extent, the value of financial reports. Timeliness is generally more important than a high degree of accuracy in the figures.

11. Adaptability

The format and contents of the **report should be suitable to the person or group of person**s who are going to use the report and the purpose for which it is required. A report can be adoptable if it is prepared and presented according to the needs of the different levels of management (top, middle and lower).

12.7 Evaluation Reports

Shondra is a consultant, and she just got a very exciting phone call. The mayor of her town wants her to examine the town's program that offers free bus rides to senior citizens. He wants her to write a report letting him know if it is working or not.

Shondra will be writing an **evaluation report**, which is a paper that examines whether a product, service, or process is working, according to a set of standards. The purpose of the paper is to evaluate a product, service, or process, hence the name.

In Shondra's case, she will be evaluating the free bus ride program for seniors and deciding whether it is working. To help her out, let's examine what goes into an evaluation report and the two main ways evaluation reports are structured.

Content

Shondra needs to evaluate the senior free ride program and then write a report for the mayor and town council. The report will offer a judgment on whether the program is working and a recommendation on whether to continue it or not.

Most evaluation reports include the same basic sections, though, as we'll see in a minute, they aren't always in the same order. The sections of an evaluation report are:

1. Introduction

In this section, the situation is introduced. For example, Shondra can explain that the purpose of the report is to evaluate the free senior ride program. She can explain what the program entails and that she will be evaluating it.

2. Background information

Shondra will want to make sure that everyone who reads her report has all the background information necessary to understand it. Here, she might want to include information about why the city instituted the program to begin with and where the funding comes from. In other situations, background might include something like technical information that is helpful when evaluating technology products.

3. Criteria

Shondra will also want to make clear the way she's evaluating the program. Cost will certainly be a factor for her evaluation, but so will how many senior citizens take advantage of the program. Further, two of the reasons the city instituted the policy was to lower the number of traffic accidents caused by older drivers and to increase the number of seniors who participated in town events. These, too, might be criteria against which Shondra evaluates the program.

In the criteria section, she won't actually evaluate the program. She'll just explain each criterion that she will use to evaluate the program.

4. Evaluation

After explaining each criterion with which Shondra is evaluating the program, she will want to explain how the program meets the criteria. In this section, she will want to include a subsection for each criterion and how the program meets, or does not meet, that requirement. For example, in the subsection on participation in town events, she can talk about how senior participation has increased and by how much.

5. Conclusions

In the conclusions section, Shondra will summarize how the program has lived up to its evaluation, or hasn't lived up to it. She might, for example, say that, even though the senior ride program costs the city a considerable amount of money, many seniors take advantage of it, which has led to a decrease in traffic accidents caused by older drivers and an increase in senior participation in town events.

Shondra might choose to create a summary table in this section with each criterion and how the program did for that criterion. That makes a nice, visual way to present information about the evaluation.

6. Recommendation

By this point, Shondra's opinion of the program should be pretty clear. But this is the section where she recommends that the program continue or not. Before this, she's evaluated it, but now she applies that evaluation. Based on her evaluation, for example, she might recommend that the city keep the program, even though it costs money.

12.8 USING TECHNOLOGY FOR EVALUATION AND ASSESSMENT

Meaning:

It is a method of analysis that systematically appraises the nature, significance, status, and merit of a technological program. Technology Evaluation should provide information that could help the actors involved in developing their strategies and that might define subjects for further Technology Evaluation analysis

Steps to Evaluate the Value of Educational Technology

Educational technology can be a powerful tool in improving learning outcomes of students. It can help educators widen the horizons of students and allow them to explore the boundaries of their freedom. It can add value to each teacher's lesson and give greater depth to each school's curriculum.

However, in order to utilize educational technology to its maximum potential, educators must take steps to evaluate the value of educational technology in their schools. Below is a step-by-step guideline by which schools can evaluate the value of educational technology as used in their institutions of learning?

Setting Goals

The first thing educators must do is set goals for each program. What do you intend to achieve by making use of a certain technology? Do you plan to increase the literacy rates of your students or are you aiming for greater inter-class participation? Are you making use of this technology to reach a wider number of students or are you aiming for specific, targeted approach to groups of students? Once you decide what your goal as an educator is, you begin to formulate specific targets by which you will measure the effectiveness of the technology being implemented. You develop and identify metrics which will be pertinent in evaluating the effectiveness of certain technologies. You set a number of criteria and standards by which you will grade the performance of your students.

Prepare to contrast information from before and after the use of technology

You must have a baseline by which you can compare your results. Establishing a baseline from which you can gauge whether there was improvement or not is important. The baseline can be a mean average or a specific number. It all depends on the type of data you will be comparing. If the data is more subjective than objective, find a way to make the data objective. For example, if you are trying to compare student behaviors before and after, it might be better to target observable and quantifiable student behaviors, such as number of times they miss school, or number of organizations they have joined.

Collect and Analyze the Data

Once you've set your goals and developed your rubrics, you must begin collecting data for future analysis. It is important that you try to be as empirical in your data collection as possible. Use surveys, test questions, student grades, and classroom observation to build up your case. Meticulous data collection and reporting is important. You cannot proceed with an accurate analysis if your date is incomplete or incorrect. Set a time limit for your data collection. Once the time limit is up, collate all data and start analyzing. Data analysis must include not only the interpretation of numerical factors but also the interpretation of behavioral factors. It must present all data collected and observed in numerical form to allow for scoring.

Using rubrics, give a score for each goals you set

After completing data analysis, give a score for each goal set using the rubrics you developed. Was there a 90% success rate using this certain technology in achieving this goal? Did more students obtain higher grades as a result? If your goal was to increase the number of graduates from your school in passing board exams, were you able to achieve it? If your goal involved changing behaviors, how successful were you when compared to the baseline you recorded from before the implementation of the technology? There must always be a score attached to each goal. When you have finished, present your findings and recommendations to the school board in a final report. Then publish these findings for peer-review.

12.9 Advantages of Technology for education

1) Technological merit
(a) Technological objectives and significance
(b) Breadth of interest of strategy
(c) Potential for new discoveries and understandings
(d) Uniqueness of proposed development strategy

(2) Social benefits
(a) Contribution to improvement of the human condition
(b) Contribution to national pride and prestige
(c) Contribution to international understanding

(3) Programmatic (management) issues
(a) Feasibility and readiness for development
(b) Technological logistics and infrastructure
(c) Technological community commitment and readiness
(d) Institutional infrastructure and implications
(e) International involvement
(f) Cost of the proposed strategy

Check Your Progress
Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. Define – Report Writing.

………………………………………………………………
………………………………………………………………

2. Describe the report writing structure.

…………………..…………………………………………..…………

12.10 LET US SUM UP

In this unit you have learnt application of technology- worksheet preparation and help to students learning, report writing ,report writing structure, qualities or characteristics of good report , essential of report, evaluation meaning , using technology for evaluation and assessment and advantages of technology for evaluation.

12.11 UNIT-END EXERCISES

1. What are the characteristics of good report?

2. Describe the advantage of technology for evaluation.

12.12 ANSWER TO CHECK YOUR PROGRESS

1. Characteristics of good report:

- Suitable Title
- Simple
- Promptness
- Comparability
- Consistency
- Precise and Accurate
- Relevant Information
- Presented to Required Person or Group or Department
- Routine Details
- Timeliness

2. Advantage of technology for evaluation:

1) Technological merit
(a) Technological objectives and significance
(b) Breadth of interest of strategy
(c) Potential for new discoveries and understandings
(d) Uniqueness of proposed development strategy

(2) Social benefits
(a) Contribution to improvement of the human condition
(b) Contribution to national pride and prestige
(c) Contribution to international understanding

(3) Programmatic (management) issues
(a) Feasibility and readiness for development
(b) Technological logistics and infrastructure
(c) Technological community commitment and readiness
(d) Institutional infrastructure and implications
(e) International involvement
(f) Cost of the proposed strategy

12.13 SUGGESTED READINGS

1. Birenbaum, M. (1997). Assessment preferences and their relationship to learning strategies and orientations. *Higher Education*.
2. Burbidge, J. L. *The Introduction of Group Technology*, John Wiley, New York, 1975.
3. Chan , H. M. , and Milner , D. A. , " Direct Clustering Algorithm for Group Formation in Cellular Manufacture ," *Journal of Manufacturing Systems*
4. Dochy, F, Segers, M and Buehl, MM. (1999). The relation between assessment practices and outcomes of studies: the case of research on prior knowledge. *Review of educational research*, 69(2): 147–188.
5. John W.Best & James V.Kahn (2009). Research in Education tenth edition. New Delhi: Prentice-Hall of India Pvt. Ltd.
6. Ruth, D. P. and M. R. Peroutka, 1993: The Interactive Computer Worded Forecast. Preprints, Ninth International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, Anaheim, Amer. Met.
7. Wier, S.K., 1995: Interpolating between grids of meteorological data. Preprints, Eleventh International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, Dallas, Amer. Meteor.

UNIT-13 APPLICATION OF TECHNOLOGY IN ASSISTIVE DEVICES

Structure

13.1 INTRODUCTION

Assistive technology refers to hardware and software designed to help people with disabilities. Some types of assistive technology provide physical assistance, while others provide helpful aids for individuals with learning disabilities. In this unit focus that, application of technology in assistive devices JAWS, smart phones and screen readers.

13.2 OBJECTIVES

After going through this unit, you will be able to:

- Know the meaning of Assistive devices
- Define the JAWS
- Discuss the Screen readers
- Understand the role of smart phones

13.3 APPLICATION OF TECHNOLOGY IN ASSISTIVE DEVICES

ASSISTIVE TECHNOLOGY

Assistive technology refers to hardware and software designed to help people with disabilities. Some types of assistive technology provide physical assistance, while others provide helpful aids for individuals with learning disabilities.

Assistive technology is a set of devices intended to help people who have disabilities. Many assistive devices are built using artificial intelligence (AI) technologies, including real-time speech-to-text transcription and visual recognition tools.

Assistive technology devices may include things like hearing aids; screen magnifiers; large-key keyboards; alternative input devices, such as touch screen displays; oversize trackballs on computer mice; speech recognition; and text readers.

The United States Assistive Technology Act of 1998 defines assistive technology -- also called adaptive technology -- as any "product, device, or equipment, whether acquired commercially, modified or customized, that is used to maintain, increase, or improve the functional capabilities of individuals with disabilities."

AND USES OF ASSISTIVE TECHNOLOGY DEVICES

Assistive technology devices give people with disabilities the ability to interact with the outside world. These devices function as a persons' eyes, ears or voice. Without them, many people would be unable to work, lead independent lives or communicate with other people.

A number of assistive technology devices make use of eye gaze trackers. Eye gaze tracking helps people with physical impairments move a mouse on a computer screen or point to words and phrases on a communication board.

There is a range of assistive technology devices to help people who have hearing loss. Hearing aids can help people who are hard of hearing, but for those with greater degrees of hearing loss, cochlear implants can restore some degree of hearing. These implanted devices bypass some of the anatomical structures involved in hearing and create a kind of electronic hearing.

Speech-generating devices help people who have communication difficulties interact with other people more easily. These communication aids allow a user to input a word or phrase that is verbalized electronically.

ASSISTIVE OR ADAPTIVE DEVICES

Assistive technology refers to "any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities", while adaptive technology covers items that are specifically designed for .

13.4 SOME EXAMPLES OF ASSISTIVE TECHNOLOGY DEVICES

Some examples of assistive technologies are: Mobility aids, such as wheelchairs, scooters, walkers, canes, crutches,

prosthetic devices, and orthotic devices. Hearing aids to help people hear or hear more clearly.

Software designed to help individuals with physical limitations is often called "Accessibility" software. Popular operating systems, such as Windows, OS X, and iOS include several accessibility features. Some examples include:

- **Text to Speech** - A computer can speak text for people with visual impairments. It also provides a way for mute individuals to communicate with others.
- **Speech to Text** - Also called dictation, this feature translates spoken words into text for people who have difficulty using a keyboard. Some operating systems allow users to speak common commands such as opening or quitting programs.
- **Voiceover** - Some operating systems can speak descriptions of items when the user selects them or moves the cursor over them.
- **Screen Zoom** - Keyboard shortcuts can be used to zoom into different areas of the screen, increasing the size of text and images.
- **Display Enhancements** - Inverting colours and increasing contrast can make it easier for individuals with limited vision to see the screen.
- **Some examples**:

13.4.1 JAWS:

JAWS ("Job Access With Speech") is a computer screen reader program for Microsoft Windows that allows blind and visually impaired users to read the screen either with a text-to-speech output or by a refreshable Braille display. JAWS are produced by the Blind and Low Vision Group of Freedom Scientific.

An October 2017 screen reader user survey by Web AIM, a web accessibility company, found JAWS to be the most popular screen reader worldwide; 46.6% of survey participants used it as a primary screen reader, while 66.0% of participants used it often.

JAWS support all versions of Windows released since Windows Vista. There are two versions of the program: the Home edition for non-commercial use and the Professional edition for commercial environments.

FEATURES

JAWS allow all major functions of the Microsoft Windows operating system to be controlled with keyboard shortcuts and spoken feedback. These shortcuts are kept as consistent as possible throughout most programs, but the very high number of functions needed to fluidly use

modern computer software effectively requires the end user to memorize many specific keystrokes. Virtually every aspect of JAWS can be customized by the user, including all keystrokes and factors such as reading speed, granularity used when reading punctuation, and hints. JAWS also include a scripting language to automate tasks and make more complex modifications to the program's behaviour**.**

13.4.2 SMART PHONE

Smartphones are type of mobile phones with multipurpose computing with many features like high hardware and operating system, Software, Internet and Multimedia functionality with basic phone functions and many more up-gradation.

Smartphones comes with all features and are everywhere in every part of the world now days every person is using a mobile phone as mobile phone comes with a variety of features and different prices. In short mobile phones are taking over our lives.

But many people have this question in mind that is; **can a cell phone be educational tool?** Yes if used in the right way. In this blog we talk about the advantages of mobile phones in education.
Mobile phones are one of the technologies that have made its mark and it's been used for higher education.

One of its advantages is that it's a portable device with amazing features.

Some of the Importance of mobile phones in education is as follow:

- Smartphones for students helps them to prepare for their future by enhancing their learning process.
- Smartphone now days are been used in biology, chemistry and engineering, many other field too because a mobile phone have good and fast processing capabilities.
- Smartphone are not only useful for students but are also very useful for teachers.
- One can solve their doubt just by a click.
- Smartphones can make learning easy as one can search helpful content and can learn from educational videos.

Smartphones have one more advantage that is students are confident in learning the things they are comfortable with and as phones are very popular with kid now days it becomes easier to make a point clear to a student by using a phone then going through pages of a book.

Smartphone application: As phone come's with various apps not just games it has a variety of informative apps to, which can be useful for students to.

Benefits of using Smartphone:

- Web Surfing
- Instant Communication

- GPS
- Privacy
- Entertainment
- Data transfer
- Various utilities

One can make smart use of smartphones Due to the audio and videos in a Smartphone as learning can become more fun and lively. And it's an effective way to teach difficult concept hence use of smartphones in education can benefit an individual if he/she uses a Smartphone effectively.

13.4.3 SCREEN READER

- A screen reader is a form of assistive technology (AT) which is essential to people who are blind, as well as useful to people who are visually impaired, illiterate, or have a learning disability.
- Screen readers are software applications that attempt to convey what people with normal eyesight see on a display to their users via non-visual means, like text-to-speech, sound icons, or a Braille device.
- They do this by applying a wide variety of techniques that include for example interacting with dedicated accessibility APIs, using various operating system features (like inter-process communication and querying user interface properties) and employing hooking techniques.
- Microsoft Windows operating systems have included the Microsoft Narrator screen reader since Windows 2000. Apple Inc.'s macOS, iOS, and tvOS include Voiceover as a built-in screen reader, while Google's Android provides reader since 2009.
- Similarly, Android-based devices from Amazon provide the VoiceView screen reader. BlackBerry 10 devices such as the BlackBerry Z30 also include a built-in screen reader. There is also a free screen reader application for older BlackBerry (BBOS7 and earlier) devices.

Check Your Progress

Notes: a) Write your answer in the space given below.

b) Compare your answer with the one given at the end of the unit.

1. What are the benefits of screen readers?

…………………………………………………………………………

…………………………..…………………………………………..……

2. Describe the JAWS.

…………………………………………………………………………

………………………………………………………….………………

13.5 LET US SUM UP

In this unit you have learnt Application of Technology in Assistive devices for example JAWS, Smart Phones, Screen Readers.

13.6 UNIT-END EXERCISES

1. Define Adaptive devices.

2. Describe the adaptive technology devices.

13.7 ANSWER TO CHECK YOUR PROGRESS

1. Assistive technology refers to "any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities", while adaptive technology covers items that are specifically designed for .

2. Adaptive technology devices: Software designed to help individuals with physical limitations is often called "Accessibility" software. Popular operating systems, such as Windows, OS X, and iOS include several accessibility features. Some examples include:

- **Text to Speech** - A computer can speak text for people with visual impairments. It also provides a way for mute individuals to communicate with others.
- **Speech to Text** - Also called dictation, this feature translates spoken words into text for people who have difficulty using a keyboard. Some operating systems allow users to speak common commands such as opening or quitting programs.
- **Voiceover** - Some operating systems can speak descriptions of items when the user selects them or moves the cursor over them.
- **Screen Zoom** - Keyboard shortcuts can be used to zoom into different areas of the screen, increasing the size of text and images.
- **Display Enhancements** - Inverting colours and increasing contrast can make it easier for individuals with limited vision to see the screen.

13.8 SUGGESTED READINGS

1. Bryant, D. P. and Bryant, B. R. 2003. *Assistive technology for people with disabilities.* Boston, MA: Allyn & Bacon.
2. Bryant, D. P., Smith, D. D. and Bryant, B. R. 2008. *Teaching students with special needs in inclusive settings* Boston, MA: Allyn & Bacon.
3. Dedui, H. (2014). When will smartphones saturate. Retrieved: June 18, 2014.

4. Derer, K., Polsgrove, L. and Rieth, H. 1996. A survey of assistive technology applications in schools and recommendations for practice.
5. Gitau, S., Marsden, G., Donner, J. (2010). After Access: Challenges Facing Mobile-Only Internet Users in the Developing World. In *SIGCHI*, (pp. 2603–06). New York, NY: ACM Press.
6. International Telecommunication Union (2012). Measuring the Information Society. Geneva, Switzerland.

UNIT-14 APPLICATION OF TECHNOLOGY IN INSTRUCTION

Structure

14.1 INTRODUCTION

Traditional classroom methods are not much effective today, because classrooms are filled with diversity. Every student is unique. Different students have different learning styles, perspectives, concerns and agendas in the learning environment. In olden days, only a few people in a class were able to achieve learning standards. But nowadays, technology suggests many approaches to develop every student equally while learning. What educators need to do is to provide students with individualized Instruction. In this unit focus that, application of technology in instruction, individualized instruction, advantages, merits and demerits and implications for inclusion.

14.2 OBJECTIVES

After going through this unit, you will be able to

- Know the application of technology in instruction
- Describe the group wise instruction
- Implications for inclusion

14.3 APPLICATION OF TECHNOLOGY IN INSTRUCTION

Technology in Instruction

Instructional technology is a specific technology field that deals with creating resources for learning. Ritchie, who defined it as "the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning."

14.4 Individualized Instruction

Tips for Individualized Instruction with the Help of Technology

Traditional classroom methods are not much effective today, because classrooms are filled with diversity. Every student is unique. Different students have different learning styles, perspectives, concerns and agendas in the learning environment. In olden days, only a few people in a class were able to achieve learning standards. But nowadays, technology suggests many approaches to develop every student equally while learning. What educators need to do is to provide students with individualized Instruction

Individualized Instruction is a method of instruction in which content, instructional technology (such as materials) and pace of learning are based upon the abilities and interests of each individual learner. Let's learn about individualized Instruction in greater detail and how educators can provide it to students by using the 21st century technology.

Individualized Instruction (also called Differentiated Instruction) is an instructional theory that allows educators to face nowadays' educational challenges by considering diverse student factors while planning curriculum and delivering instruction. The factors include learning styles, learning abilities, interests, etc., of each individual student found within a classroom. Old traditional classroom methods aren't enough to provide students with Individualized Instruction. So, 21st century teachers are searching for many technological approaches that drive them to provide students with multiple learning approaches.

Individual Instructions for students with different learning styles:

As mentioned above, different students have different learning styles. Some students learn by visualizing, some by hearing, and some by reading while many others do so by experimenting. Technology helps educators to provide students with resources that help them adopt their own learning style. A list of such resources is as follows; explore them to provide each learner with the respective technological approach.

Visual Learning:

Visual learning is a learning style in which ideas, thoughts, concepts, processes and other information are represented and associated with images, graphs, charts and videos. Students understand and learn just by visualizing.

Pinterest: Pinterest is a pin board style photo-sharing web platform. This site allows users to create and manage theme-based image collections such as events, interests and hobbies. Educators use it to help students explore and discover visual learning resources.

VariQuest**:** VariQuest provides many visual learning tools such as, the Poster Maker, Perfecta, Cutout Maker, Awards Maker, Cold Laminator, Design Center and VariQuest Software- featuring thousands of curriculum-aligned templates, eDies and graphics designed specifically for schools.

Auditory Learning:

Auditory learning is a learning style in which students learn by hearing.

Prizmo: Prizmo, an app for auditory learners, has highly accurate OCR technology with 40+ languages to read the imported photo documents.

Speak it! Speak it! Is a good solution for listening based learners? It's an easily operated app; just enter the text you want to speak and press the "Speak it" button.

You may check our previous article "List of Great Free Tools to Create Podcasts"

Kinesthetic Learning: It's a learning style where learning is done by experimentation.

There are many educational apps available on the App Store and Google Play that help students learn from experiments (moving, touching, dragging, etc.).

Online tools for Individual Instruction:

The above mentioned are the different learning styles and their respective technological learning approaches. It takes much time and effort to analyze every student's performance and the 21st century technology provides educators with the best tools that help them deliver individualized instructions to each student. Example: Power My Learning

Power My Learning: Power My Learning is a great tool for educators to deliver Differentiated Instruction by customizing the learning experience for each student. It provides a powerful set of free tools to help differentiate instruction and support learning in and out of schools.

Social Networks help you deliver personalized instructions:

If educators ask questions directly, only a few students respond to them and many people don't respond due to shyness or because they're unable to express themselves. Social networks are the best solution to engage such students because every student finds things interesting when displayed online. They can easily collaborate and share their views. Educators can also observe them from anywhere, create groups for projects and quizzes, assess them through online activities and also deliver personalized instructions. There are many educational social networking platforms that provide teachers with many classroom management tools.

Example:

Schoolfy: Schoolfy is a free educational platform that welcomes teachers from across the world into its community. It provides teachers with a private social network where they can add their students, parents and other teachers. It also provides students with tools that include setting homework, sending documents, creating calendars and students' assessments.

Individualized Instructions through Polls:

Sometimes we can't concentrate on every student's individual needs, but it helps us if we know what students need if we make them participate by sharing their opinions on a lesson plan, an assignment or on a test. Polling facilitates the creation of an interactive learning environment.

This is how technology helps educators deliver individualized instructions to each individual student for advancement of their learning. We hope this information is helpful for you to know how technology can be used to provide students with individualized instructions. Out of many, we've covered few such tips in this article because we'd like to hear about the rest from you. Please feel free to share with us your personal views and your ways of using technology to deliver individualized/differentiated instructions.

14.5 SMALL GROUP TEACHING

Defining Small Group teaching the term 'small group teaching', or 'small group learning' as it is often termed, means different things to different people. Some are familiar with the tutorial as being their experience of small group teaching. The tutorial is usually linked with a series of lectures and its role is to complement the lecture. Problem Based Learning Groups have very specific procedures in how the information is discussed, i.e. Brain-storming and reporting back on information, often completed in a 7 step procedure. Discussion groups are not linked necessarily with a series of lectures and large groups can break into small discussion groups. There is no magical number that defines a group as a Small Group. A lecturer used to taking 400 in a lecture would define 50 as a small group. As there can be sub-groups within groups, it is hard to define small group. In a discussion, where participation is assessed some students may not speak up in a group that begins to be get bigger than 10 participants and in addition tutors would find it hard to assess participation by individual students in groups with numbers greater than this. Value of Small Groups The lecture falls short when it comes to some of the generic and transferable skills required for employers, professional bodies, and in keeping with University strategic plans, e.g., - Analytic skills, Communication Skills, presentation skills (Griffiths, Partington) - Competence in personal and interpersonal skills and being able to work with people is a key requisite to success in management' (Foreman & Johnson, (2001) - Interpersonal, self-management, analytical (UCD Strategic Plan, Priority 3) Ruddok (1978), Luker (1989), Griffiths, Houston & Lazenbatt (1996) stated that students enjoyed and benefited from small groups. The tutorial specifically has been noted for its value in - Complementing knowledge in lectures. - Expanding on the concepts considered in lectures. - Encouraging student reflection - Developing students' communication skills - Encouraging active life-long learning when engaging in tutorials or small group teaching after introductions and icebreakers the first step is to establish a set of guidelines that all participants agree to adhere to.

TO HELP STUDENTS LEARN IN SMALL GROUP SITUATIONS

1. Get to know the names of the students in your groups. They will regard the tutorial as more important if they feel that you know them, and that you will notice if they are not present.

2. Tell them what to expect. Students new to universities may find the whole concept of a seminar or tutorial alien and frightening. Help them understand the difference in purpose between a lecture and a small group session.

3. Give them time to think. Students often require time to get their ideas together. Don't expect an immediate response, but allow them time to write down their ideas for a few moments before expecting them to begin a discussion.

4. Brief students in advance of the topics to be covered in forthcoming small group sessions. Give them something specific to prepare for each class, and spend some (but not all) of the time letting them share and discuss what they have prepared. Always have something up your sleeve for students to do or discuss during tutorials, for those occasions when none of the students brings questions or problems.

5. Give students activities to help them integrate the material in lectures with the rest of their experiences on the course. Help them to understand how to apply theoretical material to practical contexts.

6. Delegate activities. As the course progresses, brief individuals (or small groups) to prepare for forthcoming seminars, for example to give a 15-minute review of a topic, then open it up for discussion (with you as an expert witness only when needed).

7. Agree ground-rules for seminars. These can include things such as punctuality, contribution, preparation, and record- keeping. If, for example, students take turns preparing a short resume of what was covered in seminars, each member of the group gradually builds up a supplementary set of learning resource materials.

8. Use seminars for appropriate parts of assessed coursework. All kinds of tasks can be undertaken in small group sessions that can count towards a final assessment including assessed presentations, class tasks, work sheets and poster displays.

9. Involve them in assessing themselves and each other. The smaller groups involved in seminars can more easily participate in self-assessment and peer-assessment processes, giving students the chance to gain a detailed perspective of the sort of assessment criteria which may be involved in later exams.

10. Use small group sessions to build flexibility into the overall course. For example, give students choices from which to select the exact topics and formats of their forthcoming contributions. It can often help to invite an 'expert witness' from outside the course to contribute to particular

seminars that students themselves have requested. Indeed the students themselves can be given the task of finding such a person.

11. Use other students as proctors. It can be useful to bring in, for example, third-year students to lead a series of seminars with first-year students. The more-experienced students can often explain things in a more understandable way than someone like yourself who has probably 'known them for a long time'. Additionally, explaining things to less-experienced students is one of the best ways of deepening their own understanding of the topics they're explaining.

12. Experiment with ways of trying to keep everyone involved in seminar sessions. For example, asking students to write questions (or conclusions) on pieces of paper or overhead transparencies can overcome the problem of some students talking too much while others hardly talk at all.

13. Recognize that some students may be quite shy. Avoid being too heavy handed in your persuasion to participate in seminars, especially near the beginning of a course when they may be feeling insecure, and when they may take even slight embarrassment too seriously. ‘

14. Be sensitive to gender and culture issues. For some students, it is really difficult to challenge the tutor or speak out in the presence of others. Use tact to help students take an active part in whatever way they feel most comfortable, for example, by asking them to write things down sometimes rather than speak aloud.

15. Come quickly to the rescue if particular students seem seriously uncomfortable as they contribute to a seminar. Get to know which ones are 'robust' enough to weather any difficulties, and which ones will appreciate your helpful intervention.

16. Get students talking to each other using non-threatening icebreakers? Build up your own stock of short icebreakers, so that you can regularly start off a seminar session in an informal 'fun' way.

17. Discuss with students the value they can derive from seminars, and particularly help them to see that the more they contribute to seminars, the more they will learn themselves.

18. Ensure that students don't undervalue seminars. Don't let them fall into the trap of thinking that because seminars are less formal than lectures, they are less important. In lectures, explain now and then that 'the important issues here will form the basis of your seminars in the next week or two'.

19. Allow students to participate in different ways. Vary the activities so those students can make their contributions in a discussion, in presentations, as an individual or as a member of a group. 20. Use seminars as an opportunity to present alternative views. Having used the lecture as an opportunity to describe one particular approach to the topic, use the seminar to help students perceive different perspectives on an issue.

Small group teaching: Methods & Techniques

Different methods facilitate different kinds of student engagement and opportunities to learn.

'Mixing it up' is important. You can't please all the people all the time but designing your small group teaching session with variety in mind allows your learners to work in their comfort zones for some of the time and provides them with new challenges at others.

The name of the small group teaching session will provide some clarity on the overall teaching approach expected. These fundamentally vary in how directive the teacher is expected to be :

- Tutorials (academic): small groups of students discuss an issue, their essays or a topical problem.
- Personal tutorials: as above but also has a pastoral role in supporting students more widely if they have academic and personal difficulties.
- Problem classes: focused specifically on working through a set of given problems – these are frequently mathematical, statistical or computational.
- Seminars: groups discuss journal papers and/or other learning materials.
- Workshops: a mixture of small inputs by the tutor interspersed by work on group or individual tasks, followed by feedback to the whole group and discussion.
- Problem-based learning: A group of students work through a given scenario or problem to diagnose a solution. The group is likely to meet 2 or 3 times on each problem, gaining further information each time from a non-specialist facilitator.
- Student-led groups: students decide on the topic and how it will be discussed; tutor merely observes or may intervene if necessary.
- Self-help groups: run by students using the tutor as a resource.
- Action Learning Sets: tutor acts as a facilitator to the set, each student present issues in turn with others asking questions and suggesting ways forward – the presenting student then decides which points to act on.

In some classes it is expected that the teacher will be very knowledgeable and be prepared to lead on a specific subject or topic. The teacher is in the class to share their expertise and to 'present' information and their views to the group.

However, in many small group teaching sessions this is definitely not the role of the teacher. A more common situation is that the teacher is there to help manage the process of learning, by facilitating discussion and supporting the students to work through learning activities and tasks. Tasks that have been designed to encourage the students to think

for themselves share their ideas with each other and help them to develop a set of, much valued, academic and communication skills.

These two very different teaching roles typify, two very different teaching ideologies - firstly, a teacher-led approach and secondly, a student-led or a student-centered approach to learning.

Student-centered learning

'Student-centered learning describes ways of thinking about learning and teaching that emphasize student responsibility for such activities as planning learning, interacting with teachers and other students, researching, and assessing learning.' (Cannon, 2000)

Student-centered learning therefore, requires that students get actively involved in the learning process and take responsibility for their own learning.

The implications of this for teachers are that they place greater importance on what their learners are doing, and why they are doing it, rather than on their own actions and performances as a teacher (Biggs). It requires a mutual respect within the student – teacher relationship.

Active learning

Several authors have emphasized the importance of learners being actively engaged in the process of their own learning and have criticized educational methods that view learners as human vessels to be filled with knowledge.

Workers, such as Vygotsky, Piaget and Bruner, saw learners as people who are constructing their own understanding by interacting with knowledge and very importantly, with other people (including teachers and peers).

Constructivism

This construction process is greatly helped by the provision of frameworks, structures and mental models that help learners to begin to organise and arrange knowledge in ways that are meaningful to them. This means that each learner will build their understanding in an individualistic way and will find different personal connections points of relevance in their learning.

As a small group teacher it is going to be important to:

- challenge students to think for themselves
- help students to organise and structure their thoughts and ideas,
- encourage students to vocalise and discuss their views and understandings

- design learning activities and tasks that require students to actively engage

- Give students feedback on what they are doing well and how they can improve.

Encouraging active learning - seminar techniques

There are hundreds of different ways in which students can be encouraged to participate in a small group teaching session and actively engage with new knowledge, concepts and ideas…(and with each other).

Crossover groups: the class is sub-divided into two or more smaller groups with transfers of some students between groups at appropriate times. For example, students begin part A of a task in groups of four, after completing this, two people from one group swap places with two people from a second group – to form a new group of four. The task then continues to part B.

Buzz group: Write a question or a topic on the board and ask each student to write down any ideas / responses they have. Then ask them to share their thoughts with a colleague for a couple of minutes. Give them time to discuss and then ask the question again – asking them for their suggestions.

Brainstorming or Ideas storming: Write down a statement, a word or a question on the board. Ask the students to shout out their thoughts and ideas and write them down without comment, on the board or flipchart. Do not stop to analyse any of the suggestions, just produce the list of comments. When suggestions or time has been exhausted, organise and critique the list together. The intention is to separate ideas generation from the editing and checking phase.

Presentations: individual students or groups of students present on a topic devised by the tutor or on a self or group generated topic.

Debates: The teacher or the students can set up a debate between two opposing positions. Time is allocated before or during the class to prepare arguments and then the debate is 'chaired' by the teacher.

Jig sawing a topic: Produce two sets of cards giving two sets of alternative variables or situations. The students would be given one card from each set to generate a unique set of circumstances. For example, one set of cards could include the names of different historic figures and the second set a number of political issues – the students have to discuss or present on the connections between the person and the issue.

Snowballing: Individuals, then pairs, then fours etc to generate wider views on a topic progressively. You effectively grow the size of the working group and draw in an increasing range of views.

Mini projects: Individuals or groups work on a particular small project and report to the whole group.

Resource based tasks: Provide the students with a range of resources (could be articles, quotations, x-rays, tables of data, test results, photographs, printouts etc). Ask them to solve a problem or address a question using the provided resources.

Role play: students take on specific roles and act out the views or actions associated with those roles. This could involve experiencing different points of view or putting into practice certain skills and approaches. For example, taking a patient history, or interviewing a witness etc.

Simulations: The teacher provides the students with a set of 'briefs' that provide information and background to the simulation. The students often work in small teams to adopt different roles within the simulation. For example, groups taking the stance of different European countries in a European Union strategy negotiation.

Fishbowl: a sub-group of students are observed (in the 'fishbowl') by the rest of the students. The student in the bowl are asked to argue a case, debate or role-play a situation. The observing students are then called upon to feedback, summarise the discussion, or take the reverse role.

14.6 TECH FOR ACTIVE LEARNING IN LARGE GROUPS.

THE 'FLIPPED' CLASSROOM

This model changes the dynamic of learning and teaching to enable more active learning and can be applied to both small and large group teaching across a range of disciplines. The basic premise of this model is that pre-class independent study is typically focused on transmission of knowledge, whilst time in class is spent on active learning to provide opportunities to apply concepts and reinforce understanding. This approach is commonly used in conjunction with the peer-instruction and team-based learning methods mentioned in this article. 7 things you should know about flipped classroom provides a useful introductory guide.

THE PEER INSTRUCTION PROCESS

Eric Mazur, physics professor at Harvard University developed the peer instruction method during the early 90's as an alternative to the traditional lecture. Due to the realization that whilst his students had developed surface knowledge required to pass an exam, they lacked a genuine understanding of the basic concepts of the subject. During the peer instruction process, the tutor poses a question and then facilitates a round of discussions, questions and answers between pairs and the class. Responses are communicated using a student response system. This method provides each student the opportunity to contribute, receive

feedback, develop their own understanding and consolidate learning. You can see an example of this in action in the following video clip.

TEAM-BASED LEARNING

Larry Michaelsen (2) developed the team-based learning method as a scalable solution for making deep discussion, peer evaluation and problem solving activities manageable for large classes. In this approach, students study preparation material individually before class; during the class, they participate in a multiple choice test, individually and then as a team. This is then followed by a mini lecture to clarify responses and a series of concept application exercises. Technology can be used in a number of ways to support this approach, from using online quizzes, student response systems and online collaboration tools to facilitate in-class activities to using virtual learning environments and multimedia to provide preparation material. See case-studies from the University of Texas and University of Bradford for more information on this approach.

BACKCHANNEL COMMUNICATION

A backchannel is an online space for communication which complements (and potentially continues before and after) a lecture, presentation or teaching session. Increasingly, students are taking it upon themselves to bring laptops and mobile devices into the classroom to look up information, take notes and chat with peers – often in isolation from the rest of the class. Setting up a dedicated backchannel for a class to share notes and ask questions can be a powerful way to enable interaction, collaboration and develop a sense of community. Technologies for facilitating this might include the use of social media platforms, creating a class twitter hashtag for students to contribute to or using websites such as TodaysMeet, Moodle (Study Direct) chat to create a safe and private channel space for real-time discussion. 7 things you should know about backchannel communication and Nik Peachey's managing the digital classroom – Using a backchannel provides useful introductory information on this topic.

TASK MANAGEMENT

It can be a challenge to effectively organise and manage large groups of students participating in learning activities. Here are a few tools which can help to ease classroom management.

- Instant classroom – provides a range of tools for organising classrooms, including seating chart makers, name generators and group making facilities.
- Team+ – a free educational tool for creating team profiles, roles and tracking progress.

- Free countdown timer – a simple but effective countdown timer which can be projected from your computer screen to time activities during class.

Availability and access to technology can often be seen as a barrier to adopting approaches which require students to bring their own devices to class. It is important to give students advance notice of what's required so that they know what to bring or can make arrangements to borrow equipment from the university. The library and IT Services have set up a Chrome book loan scheme which allows students to borrow laptops for up to six hours for use anywhere on campus. Alternatively, planning pair or group activities is a great way to encourage collaborative learning and to share resources to ensure that all students can participate.

If you would like to find out more about how technology can be used to facilitate large group teaching, please contact your School Learning Technologist. We run a rich programme of TEL workshops that you might find helpful. Please see our latest workshop programme which includes 'flipped learning: from transmission to active engagement' and 'Teaching to large groups with technology'.

14.7 ADVANTAGES OF A SMALL GROUP

Information is much more easily shared in **small groups**, and in **small groups** it's much easier to respond to one another, and to organize and re-organize in response to the task at hand.

5 Benefits of Small Group Learning

Over recent years, a continuing theme in education is the overcrowding of state schools. Reports of 100,000 pupils being put into overcrowded state schools during 2010 soon changed to sports halls being converted into classrooms in 2014 and a Notting Hill primary school with a 92m catchment area. One thing we can be sure about – modern education has become a crowded and competitive market. As these changes continue to take place we start asking ourselves is there any benefit to small group learning? And does class size effect children's performance in school?

One thing we really value at Genie Tutors is our ability to take children out of those stressful, crowded surroundings and into a smaller and relaxed setting to enhance your child's ability to learn. Therefore all our tuition centers provide a small group learning environment designed to progress your child on a weekly basis. Find your local tuition centre here. Below are just five benefits to learning in smaller groups and why Genie Tutors provided this service.

1. Flexible Learning

One advantage of small group learning is that time can more flexibly be allocated to where it is needed. If one or two children are struggling with a concept, then it is likely worth the entire group working a bit harder on said topic, or failing that, it can be easier to monitor the rest of the students whilst taking one student to the side for individual attention.

2. Inspiring Confidence

Often when pupils don't participate in large group discussions, it can be an issue of self belief, rather than the assumed laziness. However, in smaller groups, the informal atmosphere can often allow tutors to bring all students into the conversation, giving them the encouragement they need to participate. Furthermore, for those in single gender or faith schools, tutoring can also be an important factor in increasing social skills with people of other backgrounds.

3. More Opportunities for Feedback

All too often at schools, feedback for students can be limited to marked work and annual parents' evenings. In smaller groups, feedback on work can go well beyond an A* to F grade, or a score out of 10. Furthermore, in the more informal and relaxed environment, students are more likely to receive instant feedback on their ideas as they are contributing more to discussions, which is hard to replicate on a larger scale.

4. People can be Patient

Lesson plans in modern teaching can often feature an airtight schedule. In the world of 30 child classrooms and constant testing, if one child needs a bit of extra attention on a particular topic, this can often slip through the cracks. This is not the fault of teachers, but merely a reality of the current education system. However, in small group settings, tutors and teachers are much more likely to be able to deviate from a less rigid plan and allow kids to develop at their own pace.

5. Small Groups can build Team Working Skills.

The more intimate environment of a small learning group is also great for building teamwork skills. Whilst students may sink into the background or get distracted in large settings, a small, tight knit team working towards the same problem or project places a child in a situation where they have to be socially active, bringing both educational and social progress forward at the same time.

Importance of small group instruction

Small group instruction is effective because teaching is focused precisely on what the students need to learn next to move forward. Ongoing observation of your students, combined with systematic assessment enables you to draw together groups of students who fit a particular instructional profile.

TEAM TEACHING

Advantages

- Better talent and skills can be used
- Repetition avoided
- Multidisciplinary team – provide integrated module
-

Disadvantage

- Requires motivation of each member

Check Your Progress
Notes: a) Write your answer in the space given below.
b) Compare your answer with the one given at the end of the unit.

1. Describe the application of technology in instruction.

…………………………………………………………………………

2. List out the implications for inclusion.

…………………………………………………………………………

14.8 LET US SUM UP

In this unit you have learnt application of technology in instruction, individual, small group, Large group, Advantages, merits and demerits and implications for inclusion.

14.9 UNIT-END EXERCISES

1. Define Students centered learning.
2. Describe the small group teaching methods and techniques.

14.10 ANSWER TO CHECK YOUR PROGRESS

1. Student-centered learning

'Student-centered learning describes ways of thinking about learning and teaching that emphasize student responsibility for such activities as planning learning, interacting with teachers and other students, researching, and assessing learning.

2. Small group teaching: Methods & Techniques

Different methods facilitate different kinds of student engagement and opportunities to learn. 'Mixing it up' is important. You can't please all the people all the time but designing your small group teaching session with variety in mind allows your learners to work in their comfort zones for some of the time and provides them with new challenges at others.

The name of the small group teaching session will provide some clarity on the overall teaching approach expected. These fundamentally vary in how directive the teacher is expected to be:

- Tutorials (academic): small groups of students discuss an issue, their essays or a topical problem.
- Personal tutorials: as above but also has a pastoral role in supporting students more widely if they have academic and personal difficulties.
- Problem classes: focused specifically on working through a set of given problems – these are frequently mathematical, statistical or computational.
- Seminars: groups discuss journal papers and/or other learning materials.
- Workshops: a mixture of small inputs by the tutor interspersed by work on group or individual tasks, followed by feedback to the whole group and discussion.
- Problem-based learning: A group of students work through a given scenario or problem to diagnose a solution. The group is likely to meet 2 or 3 times on each problem, gaining further information each time from a non-specialist facilitator.
- Student-led groups: students decide on the topic and how it will be discussed; tutor merely observes or may intervene if necessary.
- Self-help groups: run by students using the tutor as a resource.
- Action Learning Sets: tutor acts as a facilitator to the set, each student present issues in turn with others asking questions and suggesting ways forward – the presenting student then decides which points to act on.

14.11 SUGGESTED READINGS

1. Dole, J. A., Brown, K. J. and Trathen, W. 1996. The effects of strategy instruction on the comprehension performance of at-risk students.
2. Kurt, G (2012). Developing technological pedagogical content knowledge of Turkish pre- service teachers of English through a design study. Unpublished doctoral dissertation, Yeditepe University, Turkey.

3. Young, F. (1999) Case Studies in Evaluating the Benefits and Cost of Mediated Instruction and Distributed Learning: Synopses/Summaries of Eight Cases, Seal Beach, CA: Chancellor's Office, California State University.

MODEL QUESTION PAPER

M.A (CHILD CARE EDUCATION)

Max.Time:03 Hrs **Max.Marks:75**

Educational and Instructional Technology for Young Children

PART A (10X2=20)

Answer all the TEN Questions in about 100 words.

1. Define Educational Technology.
2. What are the types of Educational Technology?
3. What is meant by Differential Instruction?
4. Write short note on ICT?
5. What is Tele-teaching?
6. Define Interactive Media.
7. What are the types of instructional aids?
8. What are the limitations of Multimedia in Education?
9. What is e-book?
10. Write short note on JAWS?

PART –B (5X5=25)

Answer ALL questions choosing either (a) or (b) in about 250 words

11. a) Describe the scope of Educational Technology**.**

(OR)

b) Explain the Mass Media approach.

12. a) What are the psychological bases for ICT among teachers and learners?

(OR)

b) What are stages, requirement and process of ICT?

13. a) Explain the interactive media in inclusive settings.

(OR)

b) Describe the nature and scope of Multimedia.

14. a) Explain the Computer Managed Instructions.

(OR)

b) Describe the sharing e-books with individual and group.

NOTES

15. a) Describe the assistive devices and implication for inclusion.

(OR)

b) Describe the screen readers.

PART –C (3X10=30)

Answer any three out of five questions in about 750 words.

16. What are the various forms of educational technology? Explain in detail.

17. Distinguish between the terms hardware and software technologies and throw light on their role in modern educational practices.

18. Briefly describe the major steps involved in system approach.

19. Describe the brief the origin and growth of Information and communication technologies.

20. What is Internet? How can you access it on your PC? Discuss in brief.